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DISEASES CAUSED BY BACTERIA AND FUNGI.

I. Reis, J., & Swensson, A. (1931). Hydrolyse de l'hippurate de sodium par des Bactéries, et spécialement par celles du genre Streptocoque. [**Hydrolysis of Sodium Hippurate by Bacteria, particularly Streptococci**].—*C. R. Soc. Biol. Paris.* **107.** 647.

II. Millischer, P., & Chaillot, L. (1931). Le polymorphisme du streptocoque. [**Polymorphism of Streptococci**].—*Bull. Soc. Path. exot.* **24.** 761-763. [4 refs.]

I. Sodium hippurate was hydrolysed by 54 strains of mastitis streptococci (the majority of those tested), by all the strains isolated from normal milk and by 16 out of 31 strains of *S. equi*. It was not hydrolysed by the majority of strains from the faeces of various animals, by haemolytic strains of human origin, or by most haemolytic strains from other sources.

Strains of *Salmonella*, *B. alkaligenes*, *Shigella*, *Eberthella*, *Aerobacter*, *Proteus*, *Staphylococcus*, *Escherichia*, *Serratia*, *Pseudomonas*, *Erwinia*, *Pasteurella*, *Bacillus* and *Klebsiella* all gave a negative result.

II. The organism described showed diphtheroid forms in the throat and in plain broth but, from the characters on solid serum and agar and in serum broth, was believed to be a streptococcus.

A. W. STABLEFORTH.

Cox, G. A., & Whitehead, H. R. (1930). **The Influence of Other Bacteria on the Production of Acid by Lactic Streptococci in Milk.**—*J. Dairy Res.* **2.** 164-175. 9 figs., 2 tables. [8 refs.]

Four common milk contaminants were grown in steamed separated milk in association with lactic streptococci.

B. subtilis appeared to stimulate the production of acid, the results with *B. coli* varied, whilst staphylococci and *B. faecalis alkaligenes* had only a slight effect. There was no indication that any of these organisms are responsible for the cessation of acidity production which sometimes occurs in milk during cheese manufacture.

A. W. STABLEFORTH.

KINNEAR, J. (1931). **An Investigation into the Streptococci found in certain Diseases of the Skin.**—*Brit. J. Exp. Path.* **12.** 384-389. 2 tables. [15 refs.]

Material for investigation was enriched in 1 per cent. glucose broth, which contained 1 : 500,000 of crystal violet in order to check the growth of other organisms, particularly staphylococci. Subcultures were made within 24 hours directly on blood agar plates unless bacilli were present. In this case an intermediate culture was made in broth which contained, in addition to crystal violet, 0·06 per cent. of thallium nitrate in order to inhibit the growth of bacilli, particularly those of proteus type.

Streptococci, of which 12 were tested and proved to be haemolytic, were obtained from 23 out of 24 cases of impetigo.

S. anhaemolyticus Zangemeister, 1910, was obtained from other forms of streptococcal skin disease.

A. W. STABLEFORTH.

ROEMMELE, O. (1931). Eine Uebertragung von Karbunkulose von Rind auf Mensch durch den Melkakt. [**A Case of Transmission of Carbunculosis from Cow to Man through Milking**].—*Zeitschr. Fleisch- u. Milchhyg.* **41.** 436-437.

Carbuncles occurred on the udders and teats of six cows in a herd of 16 and a little later on the hand of the milker. Streptococci stated to be of *pyogenes* type were obtained from both sources and when injected subcutaneously into rabbits produced similar lesions. It is believed that the condition was transferred by milking and that the milker became affected in a similar manner.

A. W. STABLEFORTH.

I. JORDAN, E. O., & HALL, J. R. (1931). **Food Poisoning by Staphylococci.**—*J. Prevent. Med.* **5.** 387-389. [2 refs.]

II. JORDAN, E. O. (1931). **Food Poisoning by Staphylococci.**—*J. Amer. Med. Ass.* **97.** 1704-1707. [15 refs.]

III. —. (1932). **Food Poisoning by Staphylococci.**—*Lancet.* **222.** 33. [5 refs.]

I. Vomiting, diarrhoea and prostration occurred in two adults about three hours after consumption of chicken gravy which had been kept on ice for three days. A child who had not taken gravy remained well. A staphylococcus was obtained from the gravy and the filtrate of a 72-hour culture of this, tested at intervals up to nine weeks in doses of about 5 c.c. on human volunteers, caused similar symptoms in five out of six cases.

II. A summary of the existing evidence that food poisoning may be caused by staphylococci. In four outbreaks affecting 20 persons, staphylococci were definitely incriminated. In four others, affecting 206 persons, the evidence strongly suggested a similar association.

Amongst the vehicles were milk, custard pie, layer cake and chicken gravy [see I], the staphylococci being present in numbers from 500,000 to 30 million per gramme. The symptoms were vomiting, diarrhoea, abdominal pain and prostration ; they commenced usually within four hours of consumption of the infected food. No deaths occurred and recovery was fairly rapid. The filtrate from a 48-hour broth culture in 2 to 10 c.c. amounts caused typical symptoms in human volunteers, vomiting usually occurring after three hours. In various experiments nearly 100 volunteers were used. The author finds that the causal

staphylococci are similar to the common varieties, but that toxin production may vary. In artificial culture strains become less toxic. The potency of a toxin diminishes slowly on keeping, but it may still cause acute symptoms after at least 67 days.

The chief points of distinction from poisoning due to salmonella are the toxicity of small amounts of filtrate and the consequently much shorter incubation period.

In other articles it has been shown by the author and his co-workers that the toxin is not completely destroyed at 98° to 99° C. for half an hour and that although there was evidence that some tolerance developed, no true immunity could be demonstrated.

III. Annotation to above.

A. W. STABLEFORTH.

POPE, C. G., & PINFIELD, S. (1932). **The Production of Coccal Forms of *C. diphtheriae* in Media containing Copper.**—*Brit. J. Exp. Path.* **13.** 60-65. 3 tables. [10 refs.]

Experiments show that, when growing *C. diphtheriae* in a tryptic digest medium containing copper, the organism can be changed from the bacillary to the coccal form. The change occurred when the medium contained from 10 to 20 mg. of copper ion per litre added in the form of copper sulphate. Whilst the change to the coccal form was complete in such medium sterilized by filtration, it was never complete in media sterilized by heat, the growth consisting of mixed short bacillary and coccal forms. In medium containing the larger amounts of copper, the coccal forms grew at the bottom of the liquid whereas, in the medium in which the concentration of copper was too low to effect a change of morphology, the growth was typical of *C. diphtheriae*, a complete pellicle occurring at the surface of the medium. The authors state that culture filtrates of the coccal forms when tested for toxin by the flocculation method gave negative reactions, but they point out the possibility of traces of toxin being present if tested by more sensitive animal methods. It appears however to be definite that the toxigenic power of the bacillary is much higher than that of the coccal form in the concentration of copper used. After three generations on the copper medium the coccal forms appear to regain rapidly their toxigenic power and their bacillary form when re-sown on to control media containing no copper. [This is an excellent example of bacterial variation dependent upon the type of media used, and is abstracted here because of its general interest].

R. LOVELL.

MUNCE, T. W., & WILLEY, L. E. (1932). **Enzootic Swine Erysipelas.**—*North Amer. Vet.* **13.** No. 3. 29-36. [8 refs.]

A comprehensive survey of several outbreaks of swine erysipelas which have been encountered in South Dakota during the period 1927-1931. As far as the U.S.A. are concerned it is suggested that the existence of erysipelas in any district constitutes a menace to swine in all sections of the country.

The article contains no observations which are not known to veterinarians in European countries.

R. E. GLOVER.

SANARELLI, G., & ALESSANDRINI, A. (1932). Etudes sur l'ultravirus tuberculeux. **[Studies on the Virus of the Tubercle Bacillus].**—*Ann. Inst. Pasteur.* **48.** 144-178. 4 figs. [22 refs.]

The authors have substituted collodion sacs in filtration work for porcelain and porous-earth filter candles. They claim that collodion sacs filled with a suspension of young tubercle bacilli will infect and kill guinea pigs after introduction into their peritoneal cavities. The autopsy reveals an intense peritoneal reaction, the sac being enclosed in a fibrinous exudate, but there is no great change in the organs, neither are any acid-fast bacilli found. The inoculation of suspensions of the guinea pigs' tissues into other guinea pigs appears to kill them with a polyadenitis with enlarged spleen, but absence of tubercles, although an occasional acid-fast bacillus may be found. The passage of these tissues to a third guinea pig is said to be accompanied by the death of the animal from generalized tuberculosis with many acid-fast bacilli in the organs.

Further experiments were carried out by removal of the collodion sac from the peritoneal cavity after the death of the animal and its insertion into fresh guinea pigs in series. It is claimed that this method gradually exalts the virulence of the " virus " although typical tuberculosis of the guinea pig is only attained by passage of the tissues of the experimental animals. It appears to be necessary to passage three times before such a result is obtained. The authors point out that the " virus " does not produce tubercles or generalized tuberculosis without passage. The reactions in the peritoneal cavity consist of an inflammatory hyperplasia with the formation of giant cells and caseation. The second passage may show an occasional acid-fast bacillus in the spleen ; the bacilli become more apparent in the third and fourth passage and are then found in the liver and lungs. The difficulty of obtaining cultures of the bacilli even after passage is emphasized.

R. LOVELL.

CUNNINGHAM, R. S., & TOMPKINS, E. H. (1931). **The Epithelioid Cell.**—*Amer. Rev. Tuberc.* **23.** 71-75. [5 refs.]

LONG, E. R., VORWALD, A. J., & HOLLEY, S. (1931). **The Cellular Reaction to Infection with Tubercle Bacilli : Experiments on the Cornea in Animals of Varying Susceptibility.**—*Amer. J. Path.* **7.** 555-556.

It was previously shown by supravital staining that, in tuberculous tissues, the characteristic cell is a large mononuclear with a considerable number of fine neutral red vacuoles, and often multinucleated ; this cell was identified as the epithelioid cell. It contained a characteristic rosette when stained with neutral red and many fine droplets of fat were frequently found at the periphery. The size of the rosette and the fineness and evenness of the droplets of dye which formed it, distinguished this cell morphologically from the two highly phagocytic cells of the connective tissues—the monocyte and clasmatocyte. The conclusions were that the epithelioid cells developed from monocytes as a result of tuberculous infection, that intracellular multiplication of the bacilli takes place and that abnormal cellular division results in the formation of giant cells.

The authors found that the subcutaneous injection of almond oil, poppyseed oil, olive oil, mineral oil, suspension of agar and droplets of mercury, all induced a cellular reaction similar to that produced by the tubercle bacillus, i.e. the appearance of monocytes, epithelioid cells, clasmatocytes and Langhans giant cells. As other workers have shown that various factors, including nitrogen,

oxygen and carbon dioxide, also have a similar action, it is obvious that stimuli other than tubercle bacilli may inaugurate the production of these cells. The tissue reaction was also characterized by morphological indications of changes in the physiology of the cells which seemed to represent a depression in their function and to lead towards degeneration. The normal capacity to divide was injured so that nuclear division was not followed by division of the cytoplasm and giant cells were formed. These results are discussed in relation to cellular physiology and pathology.

The second paper is a study of the rôle of the respective exudate cells in a less complex, non-vascular tissue, the cornea, in animals of varying susceptibility. Previous experiments had shown that cats were highly resistant to the strain of bacilli used ; rabbits were less resistant and guinea pigs were highly susceptible. Tubercle bacilli were injected into the centre of the cornea of cats and rabbits and of normal and tuberculous guinea pigs. Animals from each group were killed after 6, 24 and 72 hours. In all animals a cellular reaction—extensive in normal and tuberculous guinea pigs, less so in rabbits, and still less prominent in cats—was noted six hours after injection. At 24 hours, polymorphonuclear cells had reached the site of bacillary lodgment in the centre of the cornea—in enormous numbers in the tuberculous guinea pigs, in large numbers in normal guinea pigs and in smaller numbers in the rabbit and cat. At 72 hours, a massive abscess was present in the cornea of tuberculous guinea pigs while, in all other animals, the zone of inflammation was more restricted and sharply localized. The cells present were mainly polymorphonuclear leucocytes with phagocytosed bacilli.

The localization of tubercle bacilli in a restricted area, after diffuse infection occurring before the development of an epithelioid tubercle, is brought about by these polymorphs and the extent of the cellular response is a measure of the susceptibility of the different animals. The increased outpouring of the cells in tuberculous guinea pigs indicates that they are sensitized cells in tuberculosis, and the reaction may be regarded as a manifestation of acquired immunity.

J. R. M. INNES.

COTTON, W. E., & CRAWFORD, A. B. (1932). **Second Report on the Calmette-Guérin Method of Vaccinating Animals against Tuberculosis.**—*J. Amer. Vet. Med. Ass.* **80.** 18-29. 3 tables. [3 refs.]

The first report on this investigation was published by SCHROEDER and CRAWFORD [(1929). *J. Amer. Vet. Med. Ass.* **74.** 773.]

Some doubts were then expressed as to the innocuity of BCG for guinea pigs, but further work has satisfied Cotton and Crawford that it is non-pathogenic for guinea pigs.

This report deals with immunity experiments on 16 cattle, 8 vaccinated with BCG and 8 controls, divided into three groups and exposed to natural infection with tuberculosis.

The test of immunity was carried out by exposing the vaccinated and control animals to natural infection in a 3-acre paddock containing four adult tuberculous cows.

During a considerable part of the experiment the paddock contained at least 16 animals so the severity of the test was considerably increased by the overcrowding to which the animals were subjected.

GROUP I.—Animals born and kept in tuberculous surroundings and inoculated subcutaneously with BCG at birth and twice afterwards at intervals of a year.

This group comprised six animals, three vaccinated (dose 90 to 100 mg.)

and three controls. They were exposed to natural infection with tuberculosis for about three years and were then removed and kept in fields until killed at varying intervals between the third and fifth years. On autopsy all were found to be affected with tuberculosis and there was little difference in the degree of infection between the vaccinated and the controls. [It is noted that two out of the three vaccinated animals were exposed to infection with tuberculosis for 17 months and 14 months respectively after the last inoculation with BCG. CALMETTE and GUÉRIN recommend the administration of the vaccine at yearly intervals].

GROUP II.—Animals born and kept in tuberculous surroundings and given three successive doses of 120 mg. of BCG orally within a few days of birth.

This experiment comprised six animals, three vaccinated and three controls.

[Two of the three vaccinated animals were exposed to natural infection for nearly 17 months after vaccination].

Four animals, three vaccinated and one control, were removed from the infected paddock and " kept under normal conditions for one year " before the autopsies were made ; the other two controls died of lead poisoning about six months after removal from the infected paddock.

There was very little difference in the degree of infection present in the vaccinated and control animals.

GROUP III.—This group consisted of four calves, two of which were each given three doses of 120 mg. of BCG within a few days of birth, the other two being kept as controls.

These four animals were placed, when weaned at about four months of age, in the infected paddock.

Two of the animals, one vaccinated and one control, died of injuries received from a bull three months after exposure to infection.

The two remaining animals were exposed to infection for about eleven months and then removed. Seven months later, the control animal died of lead poisoning while the remaining vaccinated animal was autopsied about one year after removal from the infected paddock.

Slight to moderate lesions of tuberculosis were found on *post-mortem* examination in all four animals and according to the authors there was practically no difference in the extent or amount of disease between the vaccinated and control animals.

T. M. DOYLE.

BANG, O., JUNDELL, I., & MAGNUSSON, H. (1931). Nouvelles recherches sur la vaccination des bovidés contre la tuberculose suivant le procédé de Calmette et Guérin. **[Further Investigations on the Immunization of Bovines against Tuberculosis with BCG Vaccine].**—*Ann. Inst. Pasteur.* **47.** 386-407. 4 tables.

The investigations reported in this article were divided into two parts ; one was carried out by Bang at the Royal Veterinary High School, Copenhagen, and the other by Jundell and Magnusson at the laboratory of the Society of Rural Economy, Malmö, Sweden.

Bang inoculated subcutaneously each of eight calves aged from two to three months with 50 mg. of BCG and five calves, aged from one to two months, were kept as controls.

Twenty-two days later, six of the inoculated calves and four of the controls were given intravenously 0·02 mg. of a virulent culture of bovine tubercle bacilli.

Two of the four controls died of generalized tuberculosis on the thirty-third and thirty-fourth days respectively ; a third animal was affected with generalized tuberculosis when killed in the tenth month, while the fourth animal recovered after an attack of fever and developed normally. This animal was killed in the tenth month and tuberculous lesions were found in the bronchial glands and omentum.

In three of the six vaccinated animals no lesions of tuberculosis were found when autopsied between the ninth and sixteenth months after vaccination.

The remaining three vaccinated animals when killed in the tenth month after vaccination showed slight to moderate lesions of tuberculosis.

In a second experiment, three calves, two vaccinated (50 mg. each subcutaneously) and one control, were exposed to severe natural infection by being housed for sixteen months with tuberculous cows. Eighteen months after inoculation [these animals were given one inoculation only of BCG] and 16 months after exposure to infection, the animals were killed and all three showed only slight lesions of tuberculosis ; therefore little information as to the protective value of BCG was gained from this experiment.

Jundell and Magnusson inoculated 14 calves subcutaneously with 50 mg. each of BCG and kept an equal number of calves of the same age as controls.

Three months later, two of these calves, one vaccinated and one control, were each given 0·01 mg. intravenously of virulent tubercle bacilli. The control died in six weeks with generalized tuberculosis while the vaccinated animal, when killed nine months after the test dose, showed only slight lesions of tuberculosis in the bronchial glands.

In a second experiment, ten calves, six vaccinated and four controls, were each given intravenously 0·01 mg. of a virulent culture of tubercle bacilli. Each of the four controls developed a generalized infection while, of the six vaccinated animals, three remained free from infection, one developed slight lesions and two showed progressive lesions of tuberculosis.

The authors conclude from these experiments that the subcutaneous inoculation of BCG generally confers a considerable degree of protection.

T. M. DOYLE.

Jundell, I., & Magnusson, H. (1931). BCG-försök å svin. [**BCG Tests on Pigs**].—*Skand. Vet.-tidskr.* **21.** 271-288. 1 fig., 3 tables. [4 refs.]

This experiment was undertaken in order to obtain reliable evidence on the value of BCG inoculation on young pigs. Previous publications are criticized as having been incomplete in some way or other.

The authors bred 24 pigs for their work. Eight pigs 4 to 6 days old were each given three daily doses of 10 mg. BCG *per os*, eight pigs 14 to 16 days old were each given one subcutaneous inoculation with 10 mg. BCG and the remaining eight were left untreated as controls.

Seven to eight weeks after inoculation all these animals with the exception of two in the control group (22 in all) were dosed *per os* with fresh tuberculous material from a case of bovine mastitis. This material was estimated to contain 2,000 million virulent tubercle bacilli per dose.

As a result all the animals given the virulent material developed tuberculosis within a space of 21 weeks, the only effect of BCG appearing to be that the infection was slightly delayed.

[A translation of this paper appeared in *Ann. Inst. Pasteur.* (1931). **47.** 408-428].

J. E.

I. KRITSCHEWSKY, N. L. (1931). Vakzination der erwachsenen ossetischen Bevölkerung des Nord-Kaukasus mittels subkutanen Verfahrens nach Calmette und Guérin (B.C.G.). [**Vaccination of the Adult Ossetian Population of Northern Caucasia by the Subcutaneous Method of Calmette and Guérin. (BCG)**].—*Zeitschr. Tuberk.* **61.** 29-35. 5 tables. [1 ref.]

II. GREIL, A. (1931). Pathobiologische Einwande gegen die Calmettesche Schutzimpfung. [**Pathobiological Objections to Calmette's Inoculation**].—*Schweiz. med. Wschr.* **61.** 127-131. [4 refs.]

III. KOMIS, A. (1931). Die mutmasslichen Ursachen der Katastrophe von Lübeck. (Experimenteller Nachweis). [**The supposed Cause of the Lübeck Catastrophe. (Experimental Evidence)**].—*Beitr. Klin. Tuberk.* **78.** 13-17.

IV. SCHURMANN. (1931). Die anatomischen Befunde bei den in Lübeck verstorbenen Säuglingen. [**The Anatomical Findings in the Infants which died at Lübeck**].—*Zlb. Gynäk.* **65.** 2190-2191.

I. A report on the effects of subcutaneous injection of BCG (0·01, 0·02 and 0·03 mg.) in 118 tuberculin-negative persons, of whom 79 per cent. were under 15 years, in two villages in which tuberculosis was widespread. Details are given of the tuberculin reactions (VON PIRQUET) at subsequent times and of complications which occurred in a large proportion of cases.

II. A theoretical discussion against the use of BCG in tuberculosis and in support of " acid inhalation," sunlight, cleanliness and suitable nourishment.

III. Komis has found that infection of a culture of BCG with *Mucor* or *Oidium albicans* renders it toxic for guinea pigs. In view of the similarity of his experimental results with the clinical and pathological findings at Lübeck, he concludes that such infection may have taken place at Lübeck.

IV. The course was subacute and in 30 per cent. the cause of death was meningitis. Primary lesions were generally present in several organs, the relative frequency being in the order :—intestine, neck and lungs. Their development varied greatly in different cases. A non-specific hepatitis occurred rather frequently.

A. W. STABLEFORTH.

I. MARCHOUX, E., MARKIANOS, J., & CHORINE, V. (1931). Le bacille de la lèpre a-t-il été obtenu en cultures artificielles ? [**Has the Leprosy Bacillus been grown in Artificial Cultures ?**]—*C. R. Soc. Biol. Paris.* **106.** 1191-1193. [2 refs.]

II. VAUDREMER, A., SÉZARY, A., & BRUN, C. (1931). Essais de cultures du Bacille de Hansen du sang et des lépromes. [**Attempts at the Culture of the Leprosy Bacillus from the Blood and from Leprous Tissue**].—*Ibid.* 1225-1228. [2 refs.]

III. OTA, M., & SATO, S. (1931). Culture de deux variétés d'un Bacille acido-résistant à partir du sang et du léprome de lépreux. [**The Cultivation of two Varieties of an Acid-fast Bacillus from the Blood and Leprous Tissues of Lepers**].—*Ibid.* **107.** 1062-1063.

I. Following the technique of SHIGA and WHERRY (who claim success in the cultivation of the leprosy bacillus) and a special technique of their own, these authors have attempted cultivation of the bacillus of rat leprosy. Their results

indicate that, instead of actual growth occurring in subcultures, the bacilli are merely transported from one medium to the next; experimental inoculation showed the germs to be dead.

II. In efforts at cultivation the authors have immersed their inocula in filtrates of *Aspergillus fumigatus*. It would seem that this medium is at least a means of conserving the leprosy bacillus; in addition, a non-acid-fast growth was obtained which later regained its acid-resistance and appeared to be connected with the bacillus of leprosy in that it was agglutinated by leprous sera.

III. The authors have made cultures on various media from 54 lepers, the majority of whom were also affected with pulmonary tuberculosis. Nine cultures of a fairly rapidly-growing acid-fast bacillus were obtained, some showing a yellow and some a white pigmentation. Rat inoculation with the yellow type provoked a rhinitis and tumefaction on the cheek and the authors consider their organisms, which they designate *Mycobacterium aurantiacum* and *M. album*, to be two variations of the leprosy bacillus.

NORMAN HOLE.

BARDANZELLU, G. M. (1931). Il terreno de Klimmer nella diagnosi differenziale fra colera e tifosi aviare. [**Klimmer's Medium in the Differential Diagnosis of Fowl Cholera and Fowl Typhoid**].—*Nuovo Ercol.* **36.** 433-434. [1 ref.]

Klimmer's brom-cresol-purple medium, used for the identification of pathogenic streptococci in milk, is found to be useful for the differentiation of *Pasteurella avisepticus* and *B. gallinarum*.

The medium is prepared as follows :—

Normal horse serum	90 c.c.
Caustic soda (15 per cent.)	10 c.c.
Liebig's extract	3 g.
Peptone	5 g.
Saccharose	10 g.
Agar	20 g.
Distilled water to	1,000 c.c.

The reaction is pH 7 and 4 c.c. of saturated solution of brom-cresol purple is added. *P. avisepticus* produces yellow colouration of the medium around the colonies while *B. gallinarum* causes no change in the violet tint of the medium.

A. LESLIE SHEATHER.

BARDELLI, P., & RAVAGLIA, F. (1931). Infezione nelle lepri di una riserva di caccia riferibile alla Tularemia. [**Tularaemia among Hares in a Shooting Preserve**].—*Clin. Vet. Milano.* **54.** 833-835. 5 figs. on 1 plate.

The specimens available for examination were some of the organs and the hind limbs of hares which had died and had been partly devoured by other animals. *Post-mortem* decomposition rendered histological examination of no value. The bone marrow was used for bacteriological examination.

A gram-negative, non-motile, aerobic organism was recovered in a state of purity. Morphologically the organism was somewhat pleomorphic, but the coccobacillary form predominated. The organism was pathogenic to rabbits and guinea pigs.

The author suspects that the organism was *Bacillus tularense*.

A. LESLIE SHEATHER.

GRAY, J. D. A. (1931). **New Lithium Selective and Enrichment Methods for the Isolation of Salmonella Organisms.**—*J. Path. Bact.* **34.** 335-342. 3 tables. [11 refs.]

With the object of determining the effect of lithium chloride on various bacteria, the author has subjected both pure and mixed cultures to various concentrations of the salt. His conclusions are that lithium chloride has a selective action and may be useful in the isolation of certain human pathogens. For the isolation of members of the salmonella group he recommends the addition of 1, 2 or 3 to 10 c.c. of peptone water, incubation for 48 hours and then sub-culturing on to MacConkey's agar plates. An alternative method of incorporating 2, 2·5 or 3 c.c. of a 10 per cent. aqueous solution of lithium chloride to plates containing 15 c.c. of MacConkey's agar is also recommended ; in this case incubation for 48 hours is advocated. Either method is considered to give better results than the brilliant green method, with or without the addition of telluric acid. A further improvement in technique was procured by removal of particulate matter from faeces by filtration through paper. In addition to certain members of the salmonella group, staphylococci and *Bact. faecalis alkaligenes* appear to be resistant to the salts of lithium.

R. LOVELL.

GAGGINO, V. (1931). Sulla presenza di paratifi nella bile di vitelli e suini sani macellati. **[The Presence of Paratyphoid Bacteria in the Bile of Healthy Calves and Pigs slaughtered for Food].**—*Nuovo Ercol.* **36.** 390-393.

The author has carried out bacteriological examinations of the organs of 250 healthy calves and 100 healthy pigs without having found any evidence of the presence of organisms of the paratyphoid group.

A. LESLIE SHEATHER.

STENIUS, R. (1932). Den smittsamma nötkreaturskastningens utbredning i Finland. **[The Incidence of Bovine Contagious Abortion in Finland].**—*Skand. Vet.-tidskr.* **22.** 254-256. 1 map.

This is an up to date note accompanied by a map showing at a glance the incidence of the disease in Finland. It is commonest in the southern and mid-west parts of Finland and elsewhere is very scarce, being unknown particularly in the north and east. Bovine contagious abortion is notifiable in Finland " in every community containing an infected farm." The number of these is given, but that of the disease-free parts is not so that the comparable information is lacking.

J. E.

WILSON, G. S., & MILES, A. A. (1932). **The Serological Differentiation of Smooth Strains of the Brucella Group.**—*Brit. J. Exp. Path.* **13.** 1-13. 1 fig., 5 tables. [12 refs.]

In a valuable contribution to the study of the brucella group of organisms the authors refer to the conflicting results experienced by various workers, including themselves, in the differentiation by serological methods of the various members of this group. The work of PANDIT and WILSON (1932) and also their own

work indicated that this confusion was due to the indiscriminate use of rough and smooth strains and mixtures of rough and smooth strains.

Working with sera prepared against smooth strains, they show that the brucella group falls antigenically into two main groups—the one group containing the bovine and porcine strains and the other group the melitensis strains. They also show that there is a considerable group affinity between them and that, by using a heavy suspension for absorption tests, each organism will remove all the agglutinins from the other sera. They explain this phenomenon by postulating the existence of two antigens in the antigenic structure of the organisms ; that both antigens are present in varying amounts in the bovine, porcine and melitensis strains, the bovine strain possessing a preponderance of one of these antigens and the melitensis strain a preponderance of the other, the porcine strain occupying more or less intermediate position. The existence of intermediate groups is referred to. A good description is given of the technique employed and of the method the authors used for preparing monospecific sera for typing purposes.

While this paper deals chiefly with smooth strains, the authors note that in their typical forms there is no serological relationship between smooth and rough strains and also that there appears to be at least one antigen common to all the para-abortus and para-melitensis strains. They also note that smooth strains are non-thermo agglutinable, non-agglutinable by salt, but sometimes slightly agglutinable by acid ; on the other hand rough strains, comprising para-abortus and para-melitensis, are thermo-agglutinable, are agglutinated strongly by acid and not infrequently by salt.

H. G. LAMONT.

GWATKIN, R. (1932). **The Prevention of Brucella abortus Infection in Guinea Pigs. The Effect of Convalescent and of Hyperimmune Serum.**—*J. Infect. Dis.* **50.** 111-118. [9 refs.]

Experiments were carried out with serum from cows naturally infected with *Br. abortus* and serum from guinea pigs artificially infected, in order to determine the protective power of these serums against *Br. abortus* infection in guinea pigs. It was shown that single injections of from 1 to 10 c.c. of fresh serum from infected cows tended to delay infection in guinea pigs, although it was less marked in guinea pigs tested by parenteral than by oral or conjunctival routes. A similar delay was experienced in guinea pigs injected with from 0·5 to 2 c.c. of hyperimmune guinea pig serum. Judging by the agglutinin content of the serum of the test animals, a preliminary dose of 5 c.c. of hyperimmune guinea pig serum delayed the production of agglutinins in guinea pigs subsequently infected. Five weekly injections of 2 c.c. of hyperimmune serum gave the best results. It is therefore concluded that some protection was conferred by these various serums against infection by the oral and conjunctival routes, but that the degree of protection was slight.

R. LOVELL.

ROBERTS, R. S., & MCEWEN, A. D. (1931). **Gas Gangrene Infections of Sheep.**—*J. Comp. Path. & Therap.* **44.** 180-191. 1 table. [9 refs.]

Continuing their investigations into the diseases of sheep on the Romney Marshes the authors have carried out research regarding the causation of gas gangrene of the parturient ewe and gas gangrene of lambs after docking or castration.

Certain areas on the marshes are reputed to be particularly dangerous for parturient ewes and, while the average loss from gas gangrene ranges from 2 to 3 per cent., it may be as high as 10 per cent. When an outbreak assumes alarming proportions it may be checked by moving the ewes to other ground and the avoidance of handling.

Gas gangrene in ewes generally runs its course to a fatal termination within three days of lambing. The lesions are usually confined to the perineal region, and comprise tumefaction of the muscles without crepitation and the presence of a gelatinous exudate of a pink to purple colour. There is generally no gas evolution. In occasional cases the muscular tissue may present the typical blackquarter appearance. The lesions found in lambs in infection after castration and docking are similar.

The extensive series of test culture media used in the earlier seasons was not employed during the 1931 season. Culture work was limited to the use of such media as would permit of the differentiation of *B. chauvoei* from *V. septique*.

In the course of the work it was found that, while subcultivation and storage cause loss of virulence in *B. chauvoei*, there is no such alteration in *V. septique*.

Cultural examinations of cases of gas gangrene within a few hours of death showed that *B. chauvoei* preponderated immensely and the question arose whether *V. septique* was merely a *post-mortem* invader.

An unfortunate occurrence when a number of sheep were vaccinated with germ-free filtrate of *B. paludis* under unfavourable conditions showed that *B. chauvoei* contaminates the Romney Marshes very heavily, and in view of this it is rather surprising that cases of blackquarter, like those occurring in cattle, do not occur in sheep.

The author's general conclusion is that gas gangrene of ewes and lambs in the Romney Marshes is caused by *B. chauvoei*.

A. LESLIE SHEATHER.

RAISTRICK, H., BIRKINSHAW, J. H., CHARLES, J. H., CLUTTERBUCK, P. W., COYNE, F. P., HETHERINGTON, A. C., LILLY, C. H., RINTOUL, M. L., RINTOUL, W., ROBINSON, R., STOYLE, J. A. R., THOM, C., & YOUNG, W. (1931). **Studies in the Biochemistry of Micro-organisms.**—*Phil. Trans. Roy. Soc. London.* Ser. B. **220.** 1-367. Many tables. [3 pages of refs.]

This is a collection of papers reporting the results of a series of researches carried out on the metabolism of moulds. A large number of different species were grown upon an inorganic medium containing glucose as the sole source of carbon. The nitrogen was supplied in the form of nitrate. The metabolic mixture resulting from the mould growth was examined by the " carbon balance sheet " method. This method, which was developed by Raistrick, consists in making an estimation of the amount of carbon present in such fractions of the final product as evolved carbon dioxide, gases other than carbon dioxide, dissolved carbon dioxide, the mycelium, volatile neutral products, volatile acids, residual glucose, non-volatile acids, carbon compounds precipitable by iron (e.g. proteins) and carbon unaccounted for. From the results of this preliminary examination, organisms which showed an exceptional figure for carbon in any of these fractions were subsequently examined more thoroughly. In this way it has been shown that many interesting products, sometimes previously unknown, can be synthesized by moulds from the original glucose. A point of interest is that few moulds produce volatile neutral compounds such as alcohol whilst none so far has been found to form volatile acids, whereas, with bacteria, volatile acids form one of the main products of glucose

utilization. Any worker interested in the chemistry of metabolism should certainly consult this very valuable contribution to the biochemistry of micro-organisms.

W. R. WOOLDRIDGE.

HAINES, R. B. (1931). **The Formation of Bacterial Proteases, especially in Synthetic Media.**—*Biochem. J.* **25.** 1851-1859. 4 tables. [11 refs.]

The author has shown that the protease (proteolytic) activity of certain bacteria depends upon the protein against which they are tested and also upon the constitution of the medium upon which the organism has been grown. Thus, working with synthetic media and organisms that can be repeatedly subcultured on these media, e.g. *B. mesentericus* and *Pseudomonas*, it is shown that protease activity can only be demonstrated in the filtered bacterial medium when magnesium and calcium are present. Although these substances generally stimulate growth, the protease activity is not dependent upon differences in the amount of growth produced. It is suggested that perhaps the effect of calcium and magnesium ions depends upon their action on interfaces and that the enzyme is only secreted into the medium in their presence.

W. R. WOOLDRIDGE.

DISEASES CAUSED BY PROTOZOAN PARASITES.

CARPANO, M. (1930). Pluralité des virus dans les infections par hémoprotozoaires et valeur de l'immunité croisée dans la création de nouvelles espéces. [**Plurality of the Viruses in Infections by Haematozoa and the Value of Cross-Immunity in the Creation of New Species**].—*Ann. de Parasitol.* **8.** 1-7. 1 fig.

The author discusses the possibility of what would be considered in bacteriology the antigenic structure of different species of blood parasites such as *Nuttallia equi*, *Babesia bovis* and *Piroplasma bigeminum*. It is pointed out that, whereas certain animals may acquire an immunity to a local strain of a parasite, yet, when subjected to infection with the same parasite in another geographical area, they may become infected. Such reactions may depend on a variety of factors, e.g. virulence, nature of immunity, latent infection and, finally, what is referred to as the plurality of the virus. For the creation of new species of parasites we should therefore consider not one but many of the biological factors concerned.

[Such a point of view is readily understood by bacteriologists who frequently find that species of bacteria closely allied in certain biological characteristics bear little or no immunological relationship, this being associated with different antigenic structures].

R. LOVELL.

GALLIARD, H. (1931). Infections mixtes à Tréponèmes et à Trypanosomes chez les animaux splénectomisés. [**Simultaneous Infections with Treponemata and Trypanosomes in Splenectomized Animals**].—*C. R. Soc. Biol. Paris.* **107.** 1282-1284.

The author describes an attempt to modify the course of the chronic disease which usually results from mixed infection with spirochaetes and trypanosomes

(*Trep. hispanicum*, *T. crocidurae* and *T. duttoni* and *Tryp. somaliense*). It is known that splenectomy has little effect upon the course of trypanosomiasis, whereas infections with spirochaetes, at least in mice, are aggravated by the operation. It was found that, in mice, infections with the two organisms were hardly modified except where the spirochaetes were of high virulence.

R. S. ROBERTS.

SCHÖBL, O. (1931). **The Prospects of Vaccination and Vaccine Therapy in Treponematoses.**—*Philip. J. Sci.* **46.** 183-187.

This is a dissertation on the prospects of vaccination for combating human treponematoses, that is yaws and syphilis. The discussion appears to revolve chiefly around the point as to the optimum period for vaccination. The most opportune time is stated to be when the tissues are normal or at a stage of "exaggerated tissue reactivity." The immunity desired is of an active variety and, therefore, the vaccination is really a substitute for active infection and in itself has no healing power. It naturally follows then that vaccination must of necessity take place when there is every prospect of a good reaction in the host and not when the reaction of the host is at a low ebb.

R. LOVELL.

LEVADITI, C., & STOEL, G. (1931). *Spirochaeta gallinarum* et cultures cellulaires. [*Spirochaeta gallinarum* **and Cell Cultures**].—*C. R. Soc. Biol. Paris.* **107.** 1528-1530. 4 figs. [3 refs.].

In a former paper the author placed *Treponema pallidum* and *Spirochaeta gallinarum* in the same class by virtue of the fact that both failed to grow in culture media in which fibroblasts grew readily. The present paper details further study of the behaviour of *Sp. gallinarum* in cell cultures consisting of 12 day chick embryo, chicken plasma and embryonic extract. Infectivity was lost in three days and motility in four days. Leucocytic migration became evident after 17 hours and multiplication of fibroblasts after 26 hours. After 48 hours, involution forms of the spirochaetes and phagocytosis (by macrophages only) could be seen.

R. S. ROBERTS.

BROWN, F. C. (1931). **Coccidiosis in Poultry.**—*New Zealand Agric. J.* **43.** 128-132.

A general paper dealing with the aetiology, symptoms and control of coccidiosis, and the legislative measures in force in New Zealand dealing with contagious diseases of poultry.

R. S. ROBERTS.

I. HUDSON, J. R. (1931). **Coccidiosis in Birds.**—*Ann. Rep. Dept. Agric. Kenya. 1930.* pp. 146-149. [2 refs.] Nairobi : Govt. Printer.

II. JOHNSON, W. T. (1931). **Effect of Five Species of Eimeria upon Egg Production of Single Comb White Leghorns.**—*J. Parasitol.* **18.** 122.

III. MAYHEW, R. L. (1931). **The Effects of Coccidiosis upon the Weights of Chickens Inoculated during the 7th, 12th and 13th weeks.**—*Ibid.* 125.

IV. Yakimoff, W. L. (1931). Les coccidies du zébu. [**The Coccidia of the Zebu**].—*Bull. Soc. Path. exot.* **24.** 644-645.

Papers II and III were presented at the 7th Ann. Meeting of the Amer. Soc. Parasitologists, New Orleans, 29th, 30th and 31st Dec.

I. The author reports the identification of *E. pfeifferi* from two healthy pigeons, *E. tenella*, *E. maxima* and *E. acervulina* from chicks infected with clinical coccidiosis and *E. maleagridis* from a young turkey.

II. In an experiment involving 65 fowls from 351 to 432 days old it was found that inoculation with a large dose of *E. mitis* and *E. praecox* led to a slight decrease in the average egg production, whilst inoculation with *E. maxima*, *E. acervulina* and *E. tenella* led to temporary cessation of egg production in the birds which survived.

III. The results of two experiments are recorded. In the first, 60 seven weeks old chicks were inoculated with coccidial oocysts and these and 54 chicks maintained free from coccidiosis were weighed at weekly intervals. The loss in weight resulting from the disease was not made good at 20 weeks old. In a similar experiment, the inoculation was made when the chicks were 13 weeks old, and the weights were still distinctly below those of the controls in the 24th week of life.

IV. Of 17 zebus examined, ten were found to be harbouring coccidia; *E. smithi* Yakimoff and Galonzo, 1927, *E. ellipsoidalis* Becker and Frge, 1929, *E. bukidnonensis* Tubangui, 1931 and *E. zürni* Rivolta, 1878, were recognized and the oocysts of a new species for which the name *E. zurnabadensis* is suggested, are described.

R. S. ROBERTS.

Nohmi, S. (1931). **Experimental Studies on Eimeria avium. II.**—*J. Jap. Soc. Vet. Sci.* **10.** 305-330. [Orig. in Japanese]. 5 pages of English summary. 5 plates. [40 refs.]

An account is given of the pathological findings in an experiment in which 78 chicks were infected with *E. avium* at intervals ranging from 30 minutes to 10 days after hatching. The following are the major points of interest. The sporozoite on arriving in the small intestine takes up a position at the free end of an epithelial cell and proceeds to send a process or pseudopodium towards the base of the cell. The reticulum is then lost and a schizont develops, which further divides into two or three schizonts and a varying number of merozoites, this division resulting in the formation of a group termed a schizont cyst. The division of schizonts derived from merozoites appears to proceed with greater vigour in the *tunica propria* than in epithelial cells; sexual development takes place mainly in epithelial cells; *E. avium* is incapable of developing in turkeys, pigeons, sparrows and ducks.

The author considers that *E. avium* is one species and that the sizes of the oocysts vary, depending upon whether the asexual cycle was passed mainly in the epithelium or in the *tunica propria*. Haemorrhage into the lumen of the intestine is due to the liberation of merozoites from the *tunica propria* and the intestinal catarrh is caused by the escape of merozoites from epithelial cells. The white spots found in the intestinal mucosa are collections of parasites in the later stages of sexual development and the lesion in the caeca is a general necrosis of the mucous membrane.

R. S. ROBERTS.

HENRY, Dora P. (1931). **Species of Coccidia in Chickens and Quail in California.** *Calif. Univ. Publicats. Zool.* **36.** 157-170.

The work recorded is a corroboration of that reported by E. TYZZER [(1929). *Amer. J. Hyg.* **10.** 269]. Some space is devoted to the isolation of pure strains by the immunization method, i.e. a chick known to be free of coccidia is immunized against one species and is then fed with a mixture of the oocysts of that species and another, the presumption being that, should disease appear, it will be due to the species against which no immunity has been set up.

R. S. ROBERTS.

I. LE BOURDÈLLES, B., & VELLUZ, L. (1931). Malaria-Floculation de Henry et Protéines du sérum palustre. [**Flocculation Test of Henry in Malaria**].—*C. R. Soc. Biol. Paris.* **108.** 402-403. [2 refs.]

II. LAVERGNE, J., & MONIER, H. (1931). Utilisation de la séro-floculation de Henry dans le diagnostic et le traitement du paludisme. [**The Use of the Serum-Flocculation Test of Henry in the Diagnosis and Treatment of Malaria**].—*Bull. Soc. Path. exot.* **24.** 539-544. [1 ref.]

I. The malaria flocculation test of HENRY consists of a reaction between certain reagents such as " mélanine choroïdienne " and ferric salts, and is considered to be somewhat comparable to the lipoids used in the serum reactions for syphilis. The authors have examined the protein and cholesterol content of the blood of human beings and also the reaction of their serum to this flocculation test. A high protein and cholesterol content of the serum is often co-existent with a positive HENRY reaction in the later stages of malaria. They consider, however, that this phenomenon has no relation to the test which is positive in the early stages of infection.

II. It is considered that a positive reaction of the flocculation test of HENRY is diagnostic of malaria and that, in the absence of other signs, either clinical or microscopical, it is justifiable to treat the patient as for malaria.

R. LOVELL.

DISEASES CAUSED BY FILTRABLE VIRUSES.

—. (1932). **Discussion on Active Immunization in Virus Diseases.**—*Proc. Roy. Soc. Med.* **25.** 451-462. 2 figs., 8 tables. [1 ref.]

The subject of active immunization against virus diseases was introduced by C. H. ANDREWS at the November meeting of the Section of Comparative Medicine of the Royal Society of Medicine.

He surveyed briefly existing knowledge and stated that the ideal to be aimed at is to induce an immunity as solid and as durable as that following natural infection with most virus diseases.

Although the use of dead or apparently dead virus is of some value, the protection it confers is comparatively slight and of short duration.

He pointed out that there is as yet insufficient data available to permit of a definite opinion as to whether the immunity following many virus infections is the result of a persistence of the virus in the system.

TULLOCH, referring to the diagnostic value of the vaccinia flocculation test, stated that its specificity appears to be proved and that the reaction is not caused by the presence in the antigen of antibodies resulting from contaminating bacteria.

Dunkin said that dogs recovered from natural infection with distemper appear to acquire a life immunity, although a few rare exceptions to this rule have been encountered. More than twenty strains of dog distemper virus have been examined and so far no evidence has been found of immunologically distinct strains.

He surveyed briefly the various methods by which dogs can be actively immunized against distemper.

Bedson stated that he had obtained a high degree of immunity against herpes by the use of a definitely killed virus and strongly recommended further investigation of the possibilities of immunization by this method.

Glover pointed out that the most satisfactory results in the immunization of animals against virus diseases have been obtained by the serum-virus method.

G. H. Wooldridge referred to the possible infectivity of the vaccinated subject during the course of developing active immunity. He did not believe that dogs vaccinated against distemper are likely to become carriers and he had never found any evidence that distemper carriers exist, " the position in this respect differing clearly from swine fever, in which the existence of apparently healthy carriers was well established." [The statement is frequently made that true " carriers "—as distinct from pigs infected with a low grade virus—exist in swine fever, but there does not appear to be any reliable evidence in support of that contention and the statement appears to be based mainly on rather vague circumstantial evidence, one author apparently following the lead of another.]

T. M. DOYLE.

Nakamura, J. (1931). **On Two Serologically Differentiable Strains of Rinderpest Virus.**—*J. Jap. Soc. Vet. Sci.* **10.** 367-373. [Orig. in Japanese]. 4 tables. [7 refs.]

The following is practically a translation of the German summary :—by means of the complement-fixation test the author was able to demonstrate a marked difference between two strains of rinderpest virus, one isolated ten years previously (the O strain) and the other originating one year previously from a spontaneous outbreak in Keikido (the K strain).

The sera from three test calves which had been hyperimmunized with lymph glands from animals infected with the K strain reacted more strongly to the homologous than to the heterologous antigen. Four antisera for the O strain acted *vice versa*.

After numerous passages of the virus through calves the two strains were still as distinct as before. No difference in the lesions caused by the two strains of virus was noticed. The strains were also distinct in their immunological relationships.

J. E.

Sasaki, M. (1931). **On the Times of Production of Complement-binding Antibodies in Experimental Rinderpest.**—*J. Jap. Soc. Vet. Sci.* **10.** 273-280. [Orig. in Japanese].

The following is a translation of the summary given in German :—by means of the complement-fixation reaction the author tested the antigenic action of Koch extract obtained from subcutaneous lymph glands at various periods in the course of experimental rinderpest in five calves. The results were all negative with those lymph glands that were removed during the incubation period and stage

of first febrile reaction. Antigenic action only occurred with lymph glands removed 24 or more hours after the beginning of the febrile reaction and from that time it increased gradually up to the end.

Similar tests performed with 47 natural cases gave nearly 90 per cent. of positive results.

J. E.

NICOLAU, S., CRUVEILHEIR, L., & KOPCIOWSKA, L. (1931). Modifications histologiques provoquées par la vaccination antirabique dans le système nerveux des lapins. [**Histological Changes in the Nervous System of Rabbits, produced by Antirabies Vaccination**].—*C. R. Soc. Biol. Paris.* **108.** 871-875. 2 figs. [2 refs.]

NICOLAU, S., VIALA, J., and KOPCIOWSKA, L. [(1930). *C. R. Soc. Biol. Paris.* **104.** 1134.] gave rabbits a series of subcutaneous inoculations with fixed rabies virus attenuated by the Pasteur method and subsequently killed them to determine whether virus could be recovered from the tissues of the peripheral and central nervous system in any instance. By the methods employed they failed to demonstrate the presence of virus in the tissues of the vaccinated animals, thus confirming REMLINGER'S observations [(1928). *Ann. Inst. Pasteur.* **42.** 729].

The present work deals with the histological changes observed in the central and peripheral nervous system of rabbits of the above series and of those of two other groups which had received a series of subcutaneous inoculations with non-attenuated fixed rabies virus and normal rabbit brain respectively.

The lesions described were most intense in the nervous tissues of rabbits inoculated with the non-attenuated fixed rabies virus. Intense histological changes were also found in the nervous system of rabbits killed from the 1st to the 17th day after the 15th injection of attenuated virus. In rabbits killed after this date the histological changes were slight or absent. No lesions were found in the series of rabbits which had received, during a period of 6, 12 or 17 days, injections of normal brain emulsions. The most intense lesions were found in the ganglia of the posterior nerve roots. They consisted chiefly of parenchymatous and some perivascular mononuclear cell infiltration, which varied in degree, accompanied by proliferation of the cells of the ganglion sheath. Tigrolysis alternated with a condensation of the Nissl's granules. Various nuclear and nucleolar modifications are also described. Occasionally the nerve trunks showed a mild mononuclear cell interstitial infiltration.

In the cerebrum, cerebellum, medulla and especially in the lumbar region of the cord, similar, but less intense, parenchymatous and perivascular mononuclear infiltration was noted. In the cerebrum a slight meningitis was also detected and in addition there was an increase in the number of the cells of the microglia and a mobilization of these round the neurons to constitute a marked satellitism. On occasion lymphocytes were also observed in the process of satellitism and in one figure given a polymorphonuclear leucocyte is seen.

[Although these very definite histological changes were present in the tissues of the vaccinated animals, no case of paralysis or other nervous symptoms is recorded].

I. A. GALLOWAY.

I. KAKTINE, A. (1931). Traitement antirabique réitéré et réactions locales. [**Repeated Antirabies Treatment and Local Reactions**].—*C. R. Soc. Biol. Paris.* **108.** 735-737.

II. Remlinger, P., & Bailly, J. (1931). Innocuité des répétitions du traitement antirabique chez l'Homme. [**Harmlessness of Repeated Antirabies Treatment in Man**].—*Ibid.* **106.** 523-524.

I. The method of vaccination adopted at the Pasteur Station for Antirabies Treatment at Riga is an intensive one in which a 2 c.c. amount of a 3 to 4 per cent. emulsion of dried rabies brain is inoculated daily for a period of from 18 to 21 days. A local reaction, which may occur at the site of inoculation of the vaccine on the first to eighth day during treatment and which generally lasts two to three days, is described. The reaction which consists of redness accompanied by infiltration and some pain is not always of the same intensity in different individuals. Sometimes it is very severe, in other cases it is mild and in rare instances entirely absent.

In small children the appearance of inflammation at the site of injection is a rarer occurrence and the reaction is milder than in adults. Corpulent people may have an inflammatory reaction affecting nearly the whole of the abdominal skin accompanied by a burning sensation and great lassitude. During a period of 17 years only three cases of actual urticaria during the period of treatment have been observed. The author gives the record of three cases in which patients received antirabies treatment several times, (3, 5 and 6 times) at intervals, the period elapsing between the different series of injections varying from one to six years. No untoward symptoms suggestive of anaphylactic phenomena were observed as a result of the second or subsequent series of inoculations of vaccine. Although in each patient it was noted that during the first series of inoculations a severe local reaction occurred, in the later series the local reaction was minimal or entirely absent.

II. The authors record the history of three patients to whom it was found advisable to re-administer antirabies treatment by Calmette's method on several occasions at intervals, owing to possible reinfection from rabid animals. In none of these cases were either local or general untoward results produced by the reinoculation, whatever the lapse of time between the different series of injections. These observations agree with Remlinger's previous findings (1908), in the dog, guinea pig and rabbit, that nervous tissue does not belong to the category of substances which provoke anaphylactic phenomena.

I. A. GALLOWAY.

Picard, W. K. (1931). Cutane enting tegen vogelpokken met een door duivenpassage gemitigeered hoendervirus (H D virus). [**Cutaneous Inoculation against Fowl Pox with Fowl Virus attenuated by Passage through the Pigeon**].—*Ned.-Indisch. Blad. v. Diergenessk.* **43.** 417-458. [Summary in English]. 3 figs. [23 refs.]

The author refers to a previous publication which appeared in the same journal in 1930 and points out that experiments in connection with immunization of poultry against fowl pox have been in progress at the Buitenzorg Institute since 1926. The paper contains a list of 23 references to the literature on the subject.

The original material used for vaccination was a formolized fowl virus, but unsatisfactory results were obtained. Subsequently, virus from other species of birds—turkeys, pigeons and ducks—were tried, but again the results were not satisfactory. The more recent work has been done with fowl pox virus derived from fowls, but passed through pigeons.

This virus is inoculated intradermally after the feathers have been removed. A reaction develops about the 5th day which remains purely localized and which disappears about the 12th day. There is no systemic disturbance. As the result of 54 passages, occupying a period of about two years, the originally very virulent fowl virus has become attenuated and has reached a constant degree of virulence. The vaccine is prepared by inoculating pigeons after removing the feathers over the breast. The birds are killed on the 12th day and the skin over the inoculated area is removed. This is ground up and dried at 37° C. It is stored in exsiccators over calcium chloride.

A single pigeon yields about 9 g. of the fresh virus which when dried weighs about 2·5 g.

For use, 1 g. of the dried virus is suspended in 10 c.c. of 60 per cent. glycerine in normal saline and filtered through cotton gauze. This yields about 8 c.c. of vaccine and each cubic centimetre is sufficient for 10 to 15 birds.

The dried vaccine retains its immunizing properties for about a fortnight only and consequently it has to be freshly prepared.

A. LESLIE SHEATHER.

I. KLIGLER, I. J., & OLITZKI, L. (1931). **Studies on Protein-free Suspensions of Viruses. III.—The Resistance to Heat and Disinfectants of Protein-free Eluates of a Bacteriophage and Fowl-Pox Virus.**—*Brit. J. Exp. Path.* **12.** 393-401. 7 tables. [4 refs.]

II. LEDINGHAM, J. C. G. (1932). **The Development of Agglutinins for Elementary Bodies in the course of Experimental Vaccinia and Fowlpox.**—*J. Path. Bact.* **35.** 140-142.

I. Kligler and Olitzki in a previous publication described a method by which active protein-free suspensions of bacteriophage and fowl pox virus respectively could be obtained. It was shown that, with regard to cataphoresis and resistance to acid, such suspensions behave differently from those containing protein.

The present paper contains the results of observations on the comparative resistance to heat and disinfectants of a coliphage and of fowl pox virus in protein and protein-free suspensions.

It was found that the presence of protein in the suspensions weakened the effect of heat and disinfectants on a bacteriophage and on fowl pox virus.

There was some similarity in the reaction of the virus and of the bacteriophage to disinfectants, but there was a difference in their susceptibility to particular antiseptics.

II. Ledingham reported in a previous communication [see this *Bulletin*. **2.** 12.] that by means of a special technique he had succeeded in obtaining pure suspensions of the elementary bodies associated with vaccinia and fowl pox (PASCHEN and BORREL bodies) and that suspensions of these bodies were agglutinated by the sera of animals (rabbits and fowls) recovered from these diseases, but not by the sera of normal animals.

The present note deals with a series of quantitative experiments on agglutinin development during the course of infection with these viruses.

Tests were carried out in hanging-drop preparations at room temperature with a time limit of 24 to 48 hours.

VACCINIA.—In a rabbit infected by the application of virus to the freshly shaved skin, agglutinins (titre 1 : 5) appeared between the fourth and sixth day and rose to a maximum titre of 1 : 400 on the 29th day. There was then a gradual fall in titre which on the 66th day was 1 : 80.

In a second rabbit, infected intradermally, agglutinins appeared between the fourth and eighth days, reached a maximum of 1 : 260 on the 12th day and then fell rapidly to 1 : 20 on the 20th day.

A second small intradermal inoculation into this rabbit raised the titre on the sixth day to 1 : 320.

Fowl Pox.—As far as the work has gone it would appear that after artificial infection the development of agglutinins is very slow. In one hen, heavily infected by scarification of the comb, agglutinins did not appear until the 17th day.

The sera of recovered fowls showed titres varying from 1 : 10 to 1 : 80 when tested at intervals varying from four months to one month after infection.

Vaccinia and Fowl Pox.—Sera which agglutinated Paschen bodies strongly caused no clumping of Borrel bodies and *vice versa* ; this confirms the results of cross immunity tests with these viruses.

T. M. DOYLE.

Hackenthal, H., & Schönberg, L. (1931). Ein neues Moment bei der Entkeimung der Pockenlymph. [**A New Consideration of the Sterilization of Smallpox Lymph**].—*Zlb. Bakt. I. (Orig.)*. **123.** 71-91. 13 tables.

The authors consider that, in the customary method of sterilizing vaccine by glycerine, there are three factors to be considered :—the resistance of the contaminating organisms, the glycerine and the changes in the organic portion of the lymph.

When incubated at body temperature, the disinfecting action of glycerine does not appear to have been very marked, but prolonged incubation (72 hours) yielded a marked fall in the organisms surviving. The authors do not think that this is really due to persistent action of the glycerine.

When the vaccine was stored in the cold chamber ($+2°$ to $+6°$ C.) with varying proportions of glycerine, the results also indicated that the glycerine was not the chief factor in the destruction of the accidental organisms and the authors' view is that the tissue elements contained in the lymph are the principal factor concerned.

A. LESLIE SHEATHER.

Yasi, H., & Kasai, H. (1931). Purification du virus vaccinal au moyen de l'adsorption par le kaolin. [**Purification of Vaccinia Virus by Adsorption with Kaolin**].—*Bull. Off. internat. Hyg. publ.* **23.** 229-232. 2 tables.

It is known that the virus of vaccinia can be adsorbed by such substances as kaolin, animal charcoal, quartz powder and aluminium hydroxide. Willstäter purified enzymes by an adsorption technique and this led the authors to try adsorption of the virus on to inert substances in order to purify vaccinal lymph. Experiments made with aluminium hydroxide, quartz powder, infusorial earth and animal charcoal showed that adsorption was generally incomplete and desorption could be effected very irregularly. Kaolin gave very good and consistent results. The authors proved that the virus could be adsorbed on to kaolin most completely in an acid medium and that it could be desorbed in an alkaline medium. The technique employed was as follows :—the pulp recently collected by scraping from calf lesions was ground up in a mortar and a 1 per cent. emulsion prepared in distilled water. This emulsion was either centrifugalized or allowed to deposit overnight and the supernatant fluid was then drawn off. An optimum amount of kaolin (Merck), 5 gm., was added to 100 c.c. of the supernatant fluid.

which was rendered slightly acid with a few drops of N/5 acetic acid. The mixture was shaken for 10 minutes and then centrifugalized for 15 minutes at 3,500 revs. per minute. The reaction of the supernatant fluid was adjusted to neutrality immediately, using phenolphthalein, and it was tested for virus content. The deposited kaolin was washed with an equal quantity of distilled water which did not prove to desorb the virus. The washed kaolin was then suspended in 80 c.c. of an N/25 ammoniacal solution and shaken in an Erlenmeyer flask for ten minutes. This process was proved to effect desorption of the virus from the kaolin which was removed by centrifugalization. The supernatant fluid was rendered neutral to phenolphthalein with N/5 acetic acid and made up to the original volume with distilled water.

The vaccinal material prepared in this way was generally a clear fluid relatively free from cells and bacteria and gave a confluent vaccinal eruption when applied to the scarified skin of a rabbit. When concentrated ten times it gave a slight biuret reaction, but the Molisch test was negative. The authors believe the method to be a very effective way of purifying vaccinal pulp.

I. A. GALLOWAY.

I. Dudley, S. F., & May, P. M. (1932). **Some Observations on the Immunity and Disability caused by Vaccinia.**—*J. Hyg. Cambridge.* **32.** 25-32. 4 tables. [7 refs.]

II. Bland, J. O. W. (1932). **Immunization with Inactive Vaccinia Virus.**—*Ibid.* 55-66. 2 tables, 2 charts. [14 refs.]

I. This investigation was undertaken to determine the degree of immunity to revaccination in a group of boys between the ages of 11 to 13 years and also to observe the effect of the substitution of one insertion of lymph in place of the usual two or three " cross-hatched " scarifications.

In a group of 329 boys revaccination produced an immediate reaction, i.e., an inflammatory areola reaching its maximum within three days, in 37 per cent. and the subjects were therefore regarded as " immune ": in addition, the probability of obtaining an immediate reaction was greater in boys possessing two or more old vaccination scars.

In comparing the two forms of vaccination, the introduction of the method of one insertion of lymph, with the consequent limitation in the amount of trauma, reduced the number of days lost from inoculation reactions by a half.

II. The experiments of Bland were designed to compare the value of emulsions of vaccine virus inactivated by phenol or formalin or heat in the immunization of the rabbit, guinea pig and monkey. It is suggested that the favourable results obtained by other investigators may be attributable to the existence in the vaccines of small amounts of living virus. In the present work, complete inactivation of the virus was presumed to have occurred when adequate amounts of the vaccine failed to produce a lesion even when the injected area was subsequently transmitted to a second animal. The immunity was tested by the dermal inoculation of falling dilutions of active virus.

The results in rabbits were disappointing as it was found that, whilst in some instances a slight immunity was produced, in others the rabbits were not immune or were hypersusceptible. In guinea pigs, a greater degree of success was obtained : they could be completely protected against from one to ten minimal infecting doses and showed a partial immunity to larger amounts of virus.

The experiments in monkeys were limited to three animals all of which received a weak vaccine killed by formalin : one was partially immunized while the others were fully susceptible.

R. E. GLOVER.

KRAMER, S. P. (1932). **Immunity to Vaccination produced in Rabbits by the Repeated Injection of a Testicular Vaccine Virus filtered through a Basic Filter.**—*J. Infect. Dis.* **50.** 119-120. [2 refs.]

The author shows that immunity to vaccinia can be produced by giving a series of subcutaneous injections of testicular vaccine virus that has been filtered through a basic filter. At least seven injections of 1 c.c. each were necessary.

Commercial virus of dermal origin, filtered and used in a similar manner, did not produce immunity to vaccinia.

H. G. LAMONT.

HUDSON, N. P., & MARKHAM, F. S. (1932). **Brain to Brain Transmission of the Submaxillary Gland Virus in Young Guinea Pigs.**—*J. Exp. Med.* **55.** 405-415. 8 figs. on 2 plates, 1 table. [9 refs.]

The salivary gland virus of young guinea pigs first described by COLE and KUTTNER [(1926). *J. Exp. Med.* **44.** 855.] is an interesting example of a virus disease associated with nuclear inclusion bodies which is apparently without lethal effect on the host.

The authors have endeavoured to exhalt the virulence of the infective agent by serial brain to brain transferences in the guinea pig. In a group of six experiments, the virus was transmitted to the brain in three instances and successful passage of the virus was attained in two of these, in one to the second generation and in the other to the third. Apparently the virulence of the infecting agent was not augmented by cerebral passage.

It appeared that the virus was sometimes present in the submaxillary glands and in the brains in cases where a microscopical examination failed to reveal the presence of inclusion bodies, suggesting that the virus may exist spontaneously in the gland or experimentally in the central nervous system without demonstrable cellular changes. When 15 days or more elapsed between cerebral inoculation and the death of the animal, inclusions were found in the salivary glands, whereas none were found at an earlier period.

The microscopical changes in the brain embraced a uniform congestion of the capillaries and a mononuclear infiltration of the meninges and the underlying cortical tissue. Many of the cells contained typical acidophilic inclusions.

R. E. GLOVER.

THOMPSON, M. Juanita. (1932). **Intranuclear Inclusions in the Submaxillary Gland of the Rat.**—*J. Infect. Dis.* **50.** 162-170. 3 figs. [10 refs.]

In the course of routine studies of the submaxillary gland of rats for the purpose of a dietary experiment, the author has noticed the presence of intranuclear inclusions. A special study of a series of 70 two months old rats has been made. These affected cells were found in 14 per cent. of the rats. The incidence was suggestive of either a seasonal variation or an epizootic of a similar nature to that which occurs in guinea pigs.

The author suggests that these intranuclear cell inclusions are caused by a virus and bases this assumption on the similarity of the lesions to those caused by other viruses. The condition described in the rats is compared with that found in guinea pigs.

The author is of the opinion that the virus is different from that causing the submaxillary condition of the guinea pig.

H. G. LAMONT.

BLANC, G., & CAMINOPÉTROS, J. (1931). Recherches expérimentales sur la sensibilité au virus de la fièvre exanthématique des animaux domestiques porteurs de *Rhipicephalus sanguineus*. [**Experiments on the Susceptibility to Typhus Fever Virus of Animals bearing** *Rhipicephalus sanguineus*].—*C. R. Acad. Sci. Paris.* **193.** 258-259. [1 ref.]

In view of the rarity of cases of typhus fever in man, it is necessary to postulate the existence of a reservoir of the virus. The authors have shown in a previous article [(1931). *C. R. Acad. Sci. Paris.* **192.** 1682.] that the infective agent can be transmitted by *Rhipicephalus sanguineus* and its progeny without the intermediary of an infected domesticated animal. Nevertheless they considered it desirable to determine whether those animals which are habitually carriers of *R. sanguineus*, were receptive to the disease.

The virus was accordingly inoculated into nine dogs, nine rabbits, two rats, a pig, a sheep and a pigeon. Blood was obtained from these animals at periods varying from the fifth up to the sixtieth day after inoculation, citrated and injected intravenously into suitable human receptors. The results were entirely negative.

It is suggested, therefore, that the animals which are habitually in contact with man, are not susceptible to the virus of typhus fever.

R. E. GLOVER.

I. LONG, P. H., DOULL, J. A., BOURN, Janet M., & MCCOMB, Emily. (1931). **The Etiology of Acute Upper Respiratory Infection (Common Cold).**—*J. Exp. Med.* **53.** 447-470. [18 refs.]

II. DOCHEZ, A. R., MILLS, Katherine C., & KNEELAND, Y. (1931). **Study of the Virus of the Common Cold and its Cultivation in Tissue Medium.**—*Proc. Soc. Exp. Biol. New York.* **28.** 513-516. [5 refs.]

I. These authors have been able to transmit the virus of common cold by the intranasal inoculation of bacteria-free filtrates of nasopharyngeal washings obtained from naturally affected subjects. They used carefully selected human volunteers for their experiments and by the use of Uhlenhuth-Seitz and Berkefeld W filters have excluded the gram-negative anaerobes which pass Berkefeld V candles and which in previous investigations have conflicted the issue. The incubation period observed in single and in serial cases varied from 20 to 70 hours.

II. The virus of common cold can be preserved for at least thirteen days in the ice-box or at room temperature in concentrated or unconcentrated form, provided that cysteine hydrochloride is added and that anaerobic conditions are maintained. Furthermore, as shown by human volunteer inoculations, the authors have prolonged the life of the virus for 74 days by cultivation in suitable tissue medium, and are of the opinion that actual multiplication *in vitro* takes place

NORMAN HOLE.

I. D'Hérelle, M. F. (1931). Le phénomène de Twort et la bactériophagie. [**The Phenomenon of Twort and Bacteriophage**].—*Ann. Inst. Pasteur.* **46.** 616-618. [2 refs.]

II. Gratia, A. (1931). Le phénomène de Twort et la bactériophagie. (Réponse à M. d'Hérelle.) [**The Phenomenon of Twort and Bacteriophage**].—*Ibid.* 619-621. 3 figs.

I. The author quotes at length the reasoning employed by Gratia, who endeavoured to show that bacteriophage and the phenomenon of Twort are due to the same principle and that the supposed differences depended upon the conditions of experiment. D'Hérelle opposed his views on the ground that, although Gratia had apparently reproduced with bacteriophage the transparent material characteristic of the phenomenon of Twort, the transformation occurred in plaques, whereas Twort himself had clearly indicated that, with his phenomenon, the transparency appeared at the point on the culture touched by the loop and immediately spread to the remainder of the culture. Gratia, however, maintained that this was merely a quantitative difference. The present article challenges Gratia's conclusions and in it d'Hérelle, having repeated Gratia's experiments, states that with bacteriophage he has never succeeded in producing the transparent material of Twort, but that what he did obtain was a secondary culture, derived from bacteria which had resisted the action of bacteriophage. He maintains that this is what Gratia described as the transparent material of Twort and reiterates his view that Twort's phenomenon is a transformation of bacteria into a sterile mass of fine granules and that the process rapidly extends when brought into contact with a surface culture, while bacteriophage is a complete dissolution of bacteria and affects a circumscribed area of the culture.

II. Gratia's reply to d'Hérelle.

Gratia affirms that with bacteriophage he has obtained the transparent material of Twort with all its characteristics, and that on microscopic examination it was found to consist of an indistinctly granular, gram-negative mass with occasional resistant cocci. Moreover, when stained by the method described by Borrel at the First Congress of Microbiology (1930), it was found to consist of an abundance of tiny red granules which, according to Borrel, are the " bacteriophage virus."

Both authors were dealing with the phenomenon in relation to staphylococcus cultures.

R. S. ROBERTS.

Andrewes, C. H., & Elford, W. J. (1932). **The " Killing " of Bacteria by Bacteriophage.**—*Brit. J. Exp. Path.* **13.** 13-21. 5 figs. [5 refs.]

The authors describe experiments with a strain of *B. coli* and a homologous bacteriophage. They show that the phage added in excess can, within a few minutes and perhaps within a few seconds, so effect the organisms that they are rendered incapable of propagation ; in other words, it apparently " kills " them. Furthermore, they show that lysis of these " killed " organisms follows in 20 to 30 minutes, provided that the temperature is maintained at 37° C. If the temperature is lowered to 20° C., lysis may not be demonstrable or may be postponed for some hours. They found that 75 per cent. of sodium citrate prevented multiplication of the phage, but that it did not, however, prevent the " killing " of the *B. coli* provided that the phage was initially present in a sufficiently

high concentration. Lysis of these killed organisms did not occur in the presence of 0·75 per cent. sodium citrate. A concentration of 0·25 per cent. sodium citrate did not prevent these phenomena from occurring.

H. G. LAMONT.

DISEASES CAUSED BY METAZOAN PARASITES.

—. (1931). **Papers contributed for the Sixth Annual Meeting of the American Society of Parasitologists, Cleveland, Ohio, 30th and 31st Dec., 1930 and 1st Jan., 1931.**—*J. Parasitol.* **17.** 106-118.

Forty papers are mentioned in this report, some by title only, but in the majority of cases the author's abstracts of from 100 to 250 words each are given. The following may be noted as of more particular veterinary interest :— Precipitin and Intradermal Tests in Trichinosis, by D. L. AUGUSTINE and H. THEILER ; The Present Status of the Ruminant Infusoria Problem, by E. R. RECKER [title only] ; Hexylresorcinol in the Treatment of Ascaris, Hookworm and Trichuris Infestations. The Results of 1,500 Human Cases egg counted before and after Treatment, by H. W. BROWN ; Study of rate of loss of Hookworms in the absence of Re-infestation, by Fred C. CALDWELL and Elfreda L. CALDWELL ; Immunity in Dogs to Aqueous Extracts of *Taenia pisiformis*, by H. E. ESSEX, J. MARKOWITZ and F. C. MANN ; Immunity Reactions of the Dog against Hookworm (*Ancylostoma caninum*) under Conditions of Repeated Infection, by O. R. MCCOY ; Concerning the Distribution of *Diphyllobothrium latum*, by by T. B. MAGATH and H. E. ESSEX ; The Incidence, Pathogenicity and Transmission of *Leucocytozoon anatis* of Ducks, by E. C. O'ROKE ; A New Nematode Parasite of the Eyes of Dogs in the United States, by E. W. PRICE ; A Comparative Study of Amoebiasis in Man, Monkey and Cat and Balantidiasis in Man, with special reference to the Early Lesions ; also Di-hydranol (2-4 di-hydroxy-phenyl-n-heptane) in the Treatment of Infections with Intestinal Protozoa, by H. L. RATCLIFFE ; The Occurrence of Self-Cure and Protection in Rabbits receiving Repeated Infections of *Trichostrongylus calcaratus* Ransom, by M. P. SARLES ; Non-specific Skin Reactions in Pigs to the Injections of Trichuris Extracts, by B. SCHWARTZ, A. MCINTOSH and W. C. MITCHELL ; Rat Mite Dermatitis and The Coincidental Occurrence of *Liponyssus bacoti* and Endemic Typhus Fever in Texas, by B. SHELMIRE ; The Origin of Digenia and The Origin of Genitalia in Digenia, by D. SINITSIN ; Studies on the Environmental Relationships of the Eggs and Larvae of the Swine Kidney Worm (*Stephanurus dentatus*), by L. A. SPINDLER [title only] ; Metabolism in Moniezia, by O. A. TISCHER [title only] ; The Blood Sucking Activities of *Ancylostoma caninum*, by H. S. WELLS ; Critical Tests of Butylidene Chloride for Equine Parasites, by W. H. WRIGHT, H. B. RAFFENSPERGER, J. BOZIEVICH and P. C. UNDERWOOD ; Studies on *Ternidens deminutus* in Southern Africa, by J. H. SANDGROUND.

E. L. TAYLOR.

PFEIFFER, H. (1931). Beiträge zu der Bakteriensymbiose der Bettwanze (Cimex lectularius) und der Schwalbenwanze (Oeciacus hirundinis). [**Bacterial Symbiosis of the Bed-Bug** (*Cimex lectularius*) **and the Swallow-Bug** (*Oeciacus hirudinis*)].—*Zlb. Bakt. I.* (*Orig.*). **123.** 151-171. 13 figs. on 1 plate. [50 refs.]

The investigation of the phenomenon of the symbiosis of bacteria with insects has shown that symbiosis is related to the nutritive material taken in by the insect.

To what extent the symbiosis is essential for the life of the host and the nature of the nutritive material are points which have not been subjected to complete investigation. The author's experiments have therefore been directed towards the cultivation of the symbionts upon artificial media and he gives the details of his technique and reviews the literature on the subject.

In a small number of cases a limited multiplication of symbionts and rickettsia occurred on media containing embryo extract, but it was not possible to obtain subcultures on the same media. It was not found possible to demonstrate any multiplication in tissue cultures.

A. LESLIE SHEATHER.

I. Manter, H. W. (1931). **Some Abnormalities of Trematodes.**—*J. Parasitol.* **18.** 124.

II. Borrel, A., & Larrousse, F. (1932). Forme anormale du *Cysticercus fasciolaris* et adénome hépatique chez le rat. [**Atypical Form of** *Cysticercus fasciolaris* **and Hepatic Adenoma in the Rat**].—*C. R. Soc. Biol. Paris.* **109.** 225-227. 2 figs.

I. [Paper presented at 7th Ann. Meeting Amer. Soc. Parasitologists, New Orleans, 29th, 30th and 31st Dec.] Monorchism is the most common abnormality and has been described in at least nine species. The author records the observation of this abnormality in four species. Microsporidian infection is recorded in two species, causing the suppression of one testis in one of them. A peculiar malformation of the eggs was seen in *Didymozoon* sp. and of the oral spines in *Stephanochasmus* sp.

II. The authors describe the development of two tumours from the liver of an experimentally infected rat; these are histologically distinct from those previously associated with *Cysticercus fasciolaris*. A nodule on the surface of the liver which was at first mistaken for a worm cyst proved on section to be a dendritic adenoma, doubtless originating from the bile ducts. The cysticercus which had presumably been the cause of this was in close proximity to and surrounded by a diffuse adenomatous growth infiltrating into the glandular tissue. It is thought that the parasite must for some unexplained reason have begun to develop in a bile duct and afterwards migrated to the parenchyma.

E. L. TAYLOR.

Tomb, J. W., & Helmy, M. M. (1931). **The Diagnosis of Intestinal Schistosomiasis by Sedimentation.**—*Trans. Roy. Soc. Trop. Med. Hyg. London.* **25.** 181-185. 5 tables. [5 refs.]

The method advocated is to emulsify the faeces in 0·7 per cent. saline, sieve, and sediment in a urine glass for 15 to 20 minutes; then to transfer 0·5 c.c. of the sediment to a slide and examine with a one-third inch objective. The authors have used this method with success for *S. mansoni*, *A. lumbricoides* and *Heterophyes*.

T. W. M. CAMERON.

—. (1931). **Australian Pastoral Research Trust—Empire Marketing Board Investigations. Part 3. (f). Internal Parasites (Worms) of Sheep.**—*J. Sci. & Indust. Res. Australia.* **4.** 138-139.

Research is being carried out at field stations in Queensland, New South Wales and Tasmania. The Queensland experiments are to find effective methods

of controlling stomach worms in sheep ; the New South Wales experiments are to determine the effects of pasture improvement, heavier stocking, pasture rotation and medicinal treatment ; and the Tasmanian experiments are to show the relative efficiency of the various standard methods of treating these worms. In addition, at Sydney laboratory, investigations are being made on life histories, pathology and treatment of sheep nematodes.

T. W. M. CAMERON.

I. Rajewskaja, S. A. (1931). Zur Charakteristik der Nematoden der Gattung Nematodirus Ransom, 1907. [**On the Characters of the Nematode Genus *Nematodirus* Ransom, 1907.**—*Ztschr. Infektkr.* **40.** 112-136. 60 figs., 1 key, host list. [16 refs.]

II. Phadke, V. R. (1931). **The Description of a New Fluke found in the Indian House-Crow** (*Corvus splendens*).—*Ind. Vet. J.* **7.** 231-237. 2 tables. [7 refs.]

III. Baylis, H. A. (1932). **On a Coenurus from Man.**—*Trans. Roy. Soc. Trop. Med. Hyg. London.* **25.** 275-280. 3 figs., 1 table. [9 refs.]

I. This paper comprises a description of the 18 known species referable to the genus *Nematodirus*. The six species *N. abnormalis*, *N. filicollis*, *N. helvetianus*, *N. mauritanicus*, *N. oiratianus* and *N. spathiger* are described from museum specimens, but the accounts of the other twelve species are taken from the literature.

Attention is particularly directed to the membranous expansion at the end of the spicules, the variation in the shape of which is thought to be of value for specific determination.

A new generic character also pointed out is the presence of a ventrally directed tooth on the dorsal side of the mouth.

II. This is a reprint from *Bull. No. 203, Imp. Inst. Agric. Res. Pusa.* During the examination of 45 of these birds the author came across six infected in the gall bladder with a species of fluke of the Dicrocoelidae. He was not able to refer the specimens to any known species, genus or sub-family and has therefore made the new sub-family Multivitellarinae, genus *Multivitellaria*, and species *M. hewletti*, full descriptions of which are given.

III. The author has made a careful examination of a portion of a coenurus cyst which had been excised from under the skin of the forearm of a native of the Belgian Congo. After comparing the rostellar hooks with those of the cyst of *Taenia multiceps* from sheep and of *T. serialis* from rabbits, he is inclined to the view that the species cannot be identified with either of these two forms. Measurements taken according to Meggit's formula from a number of hooks from these two species, and from the species under consideration, showed that there was a greater difference between hooks of various stages of development in one and the same species than between the hooks of different species and this character is thought to have little value for specific determination. Owing to the uncertain identity of the form from the Belgian Congo it is thought to be advisable not to give it a new name.

E. L. TAYLOR.

Ackert, J. E., & Cauthen, G. E. (1931). **Viability of the Eggs of the Fowl Nematode *Ascaridia lineata* (Schneider) Exposed to Natural Climatic Factors.**—*J. Parasitol.* **18.** 113.

This is a paper contributed for the 7th Ann. Meeting Amer. Soc. Parasitologists, New Orleans, 29th, 30th and 31st Dec. 1931.

The eggs are quickly destroyed by summer sunlight, but remain alive from spring to autumn in half an inch of soil. The time of survival is increased with greater soil protection ; in two inches or less the eggs do not survive normal winters, but may survive mild winters. The unsegmented ovum is most resistant to low temperatures and the infective eggs next.

T. W. M. CAMERON.

ACKERT, J. E., & BEACH, T. D. (1931). **Yeast as a Factor in the Growth of the Nematode** *Ascaridia lineata* **(Schneider).**—*J. Parasitol.* **18.** 113.

This is a paper contributed for the 7th Ann. Meeting Amer. Soc. Parasitologists, New Orleans, 29th, 30th and 31st Dec. 1931.

The authors find that the presence or absence of yeast in the diet of experimental birds has no apparent effect on *Ascaridia*.

T. W. M. CAMERON.

WETZEL, R. (1931). **On the Biology of the Fourth-stage Larva of** *Dermatoxys veligera* **(Rudolphi 1819) Schneider 1866, an Oxyurid parasitic in the Hare.**—*J. Parasitol.* **18.** 40-43. 2 figs. [5 refs.]

This paper describes the pathogenic effects of the larvae in the caecum of the hare, the morphological description of the larva being left to another author. Sections were made of the caecum at points where the larvae were attached and it was observed that they penetrate into the submucosa, sometimes as far as the circular muscular layer. The tissue immediately surrounding the parasite is necrotic and in one or two instances some of this material was observed in the mouth and pharynx of the larva. The periphery of the necrotic mass consists of a large number of eosinophile leucocytes in all stages of disintegration. Undoubtedly this is another instance of extra-intestinal digestion such as was described by HOEPPLI (1927) in *Contracaceum* sp. and by FENG (1931) in *Physaloptera* sp.

This is the second case of definite pathogenic action of a fourth-stage larva which the author has described, the previous paper describing the effects of the fourth-stage larva of *Oxyuris equi* (Schrank) [see this *Bulletin* **2.** 15].

E. L. TAYLOR.

STUMBERG, J. E., & RODRIGUEZ-MOLINA, R. (1931). **Hypersensitiveness to Hookworm Proteins in Porto Rico.**—*Porto Rico J. Publ. Health.* **7.** 37-49. 3 tables. [10 refs.]

Sixty persons of varying ages were given intradermal injections of a mixed antigen prepared from dried *Necator* (adults and larvae) *Ascaris*, and *B. coli*. The authors believe that the production of a positive wale bears no definite relationship to the presence of the parasites and is useless for qualitative diagnosis, but that the duration of the reaction may have a possible quantitative relationship with the infection.

T. W. M. CAMERON.

I. RAO, S. S., & IYENGAR, M. O. T. (1932). **The Escape of the Filaria Larva from the Proboscis of** *Culex fatigans*.—*Ind. J. Med. Res.* **19.** 941-944. 4 figs. [6 refs.]

II. Hu, S. M. K. (1931). **Studies on Host-Parasite Relationships of *Dirofilaria immitis* Leidy and its Culicine Intermediate Hosts.**—*Amer. J. Hyg.* **14.** 614-629. 5 figs. 4 tables. [9 refs.]

I. An account is here given of an observation on the way in which the larvae of *Wuchereria bancrofti* leave the intermediate host mosquito to enter the final host. Experimentally infected specimens of *Culex fatigans* were allowed to feed for a short time on a volunteer and were then removed for microscopical examination. In one of these mosquitoes a larva was observed to be emerging from the extreme end of one of the labellae. The specimen was fixed before the larva had freed itself and photomicrographs were taken which are reproduced.

II. Nine species of mosquitoes were experimentally infected with *Dirofilaria immitis*, the developmental stages in the mosquitoes being demonstrated by dissection. The microfilariae were observed to reach the infective stage in the following eight species :—*Aëdes canadensis*, *A. sollicitans*, *A. taeniorhynchus*, *Culex territans*, *Anopheles punctipennis*, *Aëdes vexans*, *A. aegypti* and *C. pipiens*, the first five of which were not previously known to serve as intermediate hosts. One specimen of *C..salinarius* was also successfully infected, but the single filarial larva which was found had not reached the infective stage.

Observations made on the proportion of individuals of each species in which infection was successfully produced, and on the numbers of infective larvae which developed, suggested a definite variation in their susceptibilities to infection. *Anopheles punctipennis* appeared to be the most suitable of the nine intermediate hosts on which the experiments were carried out ; the five species of *Aëdes* were also very suitable, but the three species of *Culex* showed a much lower degree of susceptibility.

E. L. TAYLOR.

DISEASES, GENERAL.

Graf, H. (1932). Seuchen des Rindes. [**Contagious Cattle Diseases. Extracts from Italian Veterinary Literature for 1930**].—*Deuts. tierärztl. Wschr.* **40.** 218-221. [23 refs.]

Graf, H. (1932). Klinik und Pathologie des Rindes. [**Non-infectious Cattle Diseases. Extracts from Italian Veterinary Literature for 1930**].—*Ibid.* 377-379 and 392-393. [34 refs.]

These articles are very useful summaries compiled from the Italian periodicals :—*La Nuova Veterinaria*, *La Clinica Veterinaria*, *Profilassi*, *Il Nuovo Ercolani* and *Il Moderno Zooiatro*.

The first part deals with pyelonephritis, actinobacillosis, tuberculosis, contagious abortion, foot and mouth disease, protozoan diseases (piroplasmosis) theileriasis and trypanosomiasis) and other diseases, including bovine " influenza " and contagious kerato-conjunctivitis.

The second part deals with digestive disturbances, genital diseases including milk fever and puerperal haemoglobinuria, teratology, various surgical conditions and skin diseases.

J. E.

Forssell, G. (1932). Klippning av hårtofsen framför praeputium hos avelstjurar som indirekt orsak till impotens. [**The Clipping of Preputial Hairs**

in the Bull as an indirect Cause of Impotency].—*Svensk Vet.-tidskr.* **37.** 56-62. 1 fig.

It is compulsory that in bulls sent to Swedish cattle auctions the hairs at the end of of the prepuce be clipped short and this paper records the case of an impotent bull in which, apart from dermatitis of the inside of the prepuce and a tumour growth on the penis, there was no sign of disease. The lesion was attributed to the treatment. The application of local astringents and caustics did not cause improvement and it was only on microscopical examination of tissues after death that an inturned hair stump was found in the overgrowth of tissue. Other similar cases are referred to by the author and general advice is given as to treatment. He also makes an appeal that the regulation concerning the clipping operation at markets be cancelled.

J. E.

I. Claudon, A. (1931). Le Darmous. Dystrophie dentaire des espèces domestiques de la Haute-Chaouia. [**" Darmous." Dental Dystrophy of the Domestic Species of the Haute-Chaouia (Morocco)**].—*Thesis for Docteur Vétérinaire, Lyon.* 34 pp. 3 figs. [14 refs.]

II. Velu, H. (1932). Le Darmous (ou Dermes). Fluorose spontanée des zones phosphatées. [**" Darmous." Spontaneous Fluorosis of the Phosphate Areas**].—*Arch. Inst. Pasteur d'Algérie.* **10.** 41-118. numerous figs. [50 refs.]

I. " Darmous " is a disease of all the common domestic animals ; it occasionally occurs in man, but is commonest in sheep. It is characterized by a dystrophy of all the permanent teeth, both the incisors and the molars being affected ; the malformation arises during the tooth development and the permanent teeth are already affected when erupted.

The disease has a purely local incidence, being limited to the phosphate country [" rock phosphate " containing, in the locality under review, 60 to 75 per cent. of tricalcium phosphate and 1 to 2·5 per cent. of fluorine] situated to the south of Casablanca, and elsewhere. The dystrophy takes the form of multiple minute or large erosions in the enamel, with the result that, after eruption, the teeth wear down quickly and, when the condition is advanced, the animals cannot feed and are liable to die from starvation.

That the causation is connected with a certain area of country is clear from the fact that, if animals are removed from it during the period while the permanent teeth are developing, no tooth abnormality occurs and, whether or not they are moved back to the " darmous " country afterwards, the teeth remain normal.

Claudon discusses much that might have a bearing on aetiology and leaves the question open, merely asserting the connection between " darmous " and the phosphate rock in the earth in the locality.

II. Doctor Velu, Chef du Laboratoire de Recherches du Service de l'Elevage au Maroc, has investigated this disease extensively in the French Northern African colonies and states that he has solved the problem of aetiology. This paper incorporates the results of the work and is assumed to cover all the literature on " darmous " up to the end of 1931. Velu prefers to define " darmous " as " a chronic intoxication characterized by various general symptoms and disorders of the calcium-phosphorus metabolism, manifested particularly by more or less complex dystrophy of the permanent teeth."

The irregularities in the dentition are described in detail and illustrated by photographs which unfortunately are very poorly reproduced. Affected teeth,

besides not growing to their normal size, have malformed enamel varying from erosion to patches of insufficiency. Not all the permanent teeth are equally affected.

There are commonly great cavities and eminencies along the arcade in the premolar and molar teeth. Velu travelled in Algeria and Tunis and was able to support the observation of Claudon that there is a connection between " darmous " and the drinking of water originating from rock phosphate. Areas in which this formation occurs are illustrated on maps given in the original paper.

As the next step the local rock phosphate was analysed and compared with similar rock from other parts of the world. Tables of analyses are given and a review is made of considerable work done in America upon the rôle of natural phosphates in animal nutrition. This is summarized as follows :—(1) in doses amounting to 0·34 per cent. of the ration, phosphate causes no appreciable trouble in swine even when given for several months ; (2) at a level of 3 per cent., phosphate causes anorexia and emaciation in dairy cows and (3) when administered at a level of 1·5 to 1·8 per cent. for many months (or years), phosphate causes teeth lesions identical with those caused by sodium fluoride. Certain American workers attribute the harmful effects of natural phosphates to the fluorine they contain.

In the course of discussing fluorine poisoning the author reviews the knowledge relating to fluorine in animal physiology (its occurrence in the body), in plant life, and natural phosphates and natural waters. The literature on fluorine poisoning is cited and the symptomatology is compared with that of " darmous " with which there is close resemblance.

Some experiments were performed with the object of reproducing " darmous " experimentally and to this end seven lambs were given natural local rock phosphate in a proportion of 3 per cent. of their ration [see this *Bulletin*. **2.** 228.] over a period of two years ; severe permanent tooth disorder was present at the end of that time. Thus the connection between " darmous " and natural phosphate appeared to be established.

Calcium fluoride, a nearly insoluble constituent of natural phosphate was fed mixed with the ration to ten adult white rats in daily doses of 15 mg. ; death followed in from 96 to 278 days with the usual symptoms of fluorosis.

Two further lots of feeding experiments on white rats were carried out ; two series of ten rats each were given Moroccan rock phosphate and Algerian rock phosphate respectively and the effect on the rats was similar to that caused by calcium fluoride, the Algerian phosphate being more toxic (judged by the time factor) than the Moroccan.

To test further the way in which animals may assimilate the injurious substance, the author kept six lambs, feeding them on a normal ration and allowing a sufficiency of water supplied in a basin composed of natural phosphate. The lambs grew well for nine months, then started to lose condition and after a further two months were very thin, ate very little and showed typical symptoms of " darmous."

From these experiments the author claims to have proved that " darmous " is caused by the drinking of water which has passed through rock layers containing natural phosphate. He believes further that fluorine present in the phosphate is actually responsible for the lesions. Analogous experiments on white rats showed a clear resemblance between chronic fluorine poisoning and the disease caused by this water.

The economic consequences of " darmous " to the animal industry and to man are discussed. These may be of great significance, but as the cause is now considered to be known, it may be possible to prevent the losses.

J. E.

Carr-Fraser, W. A. (1931). **Paralysis in Pigs.**—*J. Sci. & Indust. Res. Australia.* **4.** 255.

This is a preliminary note on pig paralysis as it occurs in Australia and a comparison with various paralytic syndromes in pigs occurring in the United States of America which the author visited for study purposes. As no serious work on this matter has been done in America, the author is unable to identify the American and Australian paralyses. He believes that a nutritional factor is partly responsible in Australia.

No clinical details are given here. J. E.

Luparia, S. (1931). La tubercolosi e la leucomielosi dei polli. Diagnosi differenziale anatomo-pathologica e microscopica. Sua importanza. [**Tuberculosis and Leucomyelosis of Poultry. Differential Diagnosis**].—*Nuovo Ercol.* **36.** 427-432.

The author emphasizes the necessity of the definite detection of acid-fast bacilli in arriving at a diagnosis of tuberculosis, and of making a qualitative and quantitative examination of the leucocytes in the blood in suspected cases of leucomyelosis.

A. LESLIE SHEATHER.

Woods, Hilda M., & Stallybrass, C. O. (1932). **The Part played by Meteorological Conditions on Respiratory Mortality in Liverpool.**—*J. Hyg.* **32.** 67-78. 15 tables, 1 chart. [8 refs.]

A statistical analysis has been made of meteorological and respiratory mortality data collected in Liverpool over a period of years. There appears to be no demonstrable association between respiratory mortality in young children and meteorological conditions, but variations in temperature and evaporation have considerable influence on adult mortality at certain periods of the year. Rainfall does not seem to be a factor of importance.

W. R. WOOLDRIDGE.

Harris, K. E. (1931). **Urticaria: Some Observations upon the Vascular Reactions in the Skin.**—*Quart. J. Med.* **24.** 347-368. 5 tables, 16 figs. [19 refs.]

The skin reactions of sixteen human cases of spontaneous urticaria have been studied. The author points out that "spontaneous" is used to describe cases in which no specific factor, such as cold, light or phenomena related to animals could be found. Reference is made to the opinion which is held as to the common factor existing in the many different forms of stimuli which give rise to the same skin reaction. This common factor is considered to be tissue injury accompanied by the liberation of a substance or substances having a histamine-like action. This has been termed the H substance. Harris is of the opinion that the mechanism involved in his cases of spontaneous urticaria is the same as for those urticarias which are specific to one type of stimulus. He bases his opinion upon the general characteristics of the eruption, the increased blood-flow and the phenomenon of refractoriness. He therefore considers it to be due to the release of the histamine or H substance from the skin cells. It was suggested by transference tests that a

toxic body may be circulating in the blood of certain people and that, whatever its nature or origin may be, it acts by producing a definite skin reaction which is known as spontaneous urticaria.

R. LOVELL.

IMMUNITY.

I. MENDELEEFF, P. (1931). Précipitation des substances actives et inhibitrices du sarcome S.37. de Souris. [**Precipitation of Active Substances and Inhibitors of the S.37 Sarcoma of Mice**].—*C. R. Soc. Biol. Paris.* **108.** 823-825. [3 refs.]

II. MENDELEEFF, P. (1931). Quelques propriétés physico-chimiques des substances actives et inhibitrices du sarcome de Souris S.37. [**Some Physical and Chemical Properties of Active Substances and Inhibitors of the S.37 Sarcoma of Mice**].—*Ibid.* **107.** 899-900.

I. The author found in previous experiments that, by washing an old sarcoma preparation with Locke's solution, inhibiting substances could be obtained, whereas active substances were obtained by washing with distilled water. Two washings with each substance were employed. In the present work an attempt was made to precipitate these substances and obtain them in a pure state.

To 10 c.c. of each solution, 2·5 c.c. of M/5 acid potassium phthalate was added giving a pH of 4 to 4·2. These acidified liquids immediately became opaque. Centrifugation deposited the substance leaving the supernatant fluid clear. To each precipitate was added 1·5 c.c. of 0·4 per cent. solution of bicarbonate of soda and 8·5 c.c. of Locke's solution. The precipitate was completely dissolved by agitation in the solutions at a pH of 8·2. Mice affected with cancer were inoculated under the skin with 1 c.c. of each solution on two occasions.

The findings show that the solutions of the second washings give better results than those of the first. The precipitate of the second washing with Locke's solution, after seven days treatment, caused the disappearance of four tumours in a group of five mice and in the fifth mouse the size of the tumour was greatly reduced. The precipitate obtained by the distilled water of the second washing caused rapid growth in all the tumours treated with this extract.

II. The experiments recorded show that the inhibiting substances lose much of their action *in vivo* after heating at 56° or 60° C. for 30 minutes. In the fresh condition such a substance caused the disappearance of tumours in four cases out of five. After treatment with the heated substance the tumours mostly increased in size or remained little changed.

Tumours treated with the non-heated active substance showed a rapid increase in size in two weeks, whereas those treated with the heated active substance diminished in size and in some cases disappeared.

NORMAN DOBSON.

HAVENS, L. C., & MAYFIELD, Catherine R. (1931). **The Significance of Agglutinins in Normal Persons.**—*J. Prevent. Med.* **5.** 295-301. 4 tables. [11 refs.]

The serums of 1,136 normal persons were examined for agglutinins to *Bact. typhosum*. In all, 263 or 23 per cent. were positive in a dilution of 1 : 40 or higher. In the case of 60 of the 263 persons it was possible to determine whether they had been vaccinated or had previously suffered from a clinical attack of typhoid

fever. Only seven had been vaccinated and only five gave a history of previous typhoid infection. If this group of 60 is a fair sample, then the authors argue that only 20 per cent. of positive Widal reactions are the result of a clinical attack of typhoid fever or previous vaccination. [No mention is made of the type of suspension used for agglutination or whether flagellar or somatic agglutinins were being searched for. In order to distinguish agglutinins due to infection from those which are normal or due to previous vaccination, it is often advisable to examine the serum twice with an interval of a few days during which a rise in the agglutinin content will appear in the case of active infection].

Agglutinins for the Flexner type of dysentery bacillus were looked for in 75 samples of serum and 44 or 58 per cent. were positive.

Because of the high percentage of agglutinins in both samples, 25 sera all of which contained agglutinins for *Bact. typhosum*, were re-examined for agglutinins for *Bact. paratyphosum* A, B and C, two strains of *Bact. morgani*, the Shiga, Flexner, Strong and Y types of dysentery bacilli, *B. proteus X19*, *Br. abortus*, *Bact. enteritidis* and *Bact. suipestifer*. The results indicated that 23 had agglutinins for the Flexner type of dysentery bacillus and 10 for the Strong type, whilst for the other bacteria none or relatively few were positive. Cross absorptions showed the specificity of typhoid and Flexner dysentery agglutinins in six sera examined.

An outbreak of meningitis enabled the authors to examine the sera of 24 convicts who were known to have carried a meningococcus for four weeks, and also the sera of 20 non-carriers. Agglutinins against two strains of meningococci were more frequent and better developed in the carriers than the non-carriers.

From this data the authors argue that agglutinins develop as the result of a specific antigenic exposure under natural conditions even without clinical manifestations and that in the absence of such antigenic stimulus such agglutinins do not develop. The high incidence of Flexner agglutinins and the low incidence of agglutinins for other bacteria in the sample of 25 examined is stated to be correlated with the incidence of such diseases in Alabama, and the authors argue that the incidence of antibodies against a given infectious agent is one index of the prevalence of that infection in the region in which the study was made. Based on the absorption tests of six sera, it is further stated that so-called " normal " agglutinins behave in the same manner as, and are in all respects indistinguishable from, specific antibodies.

R. LOVELL.

MALLICK, S. M. K., & MAITRA, G. C. (1932). **On the Distribution of Protective Principle in Different Protein Fractions of Horse Serum Immunized against Snake Venom.**—*Ind. J. Med. Res.* **19.** 951-955. 1 table. [10 refs.]

Antivenomous horse serum was treated with ammonium sulphate in different concentrations so that the euglobulin (33 per cent. ammonium sulphate), the pseudoglobulin (50 per cent. salt) and the albumin (saturated) fractions could be serially separated. These fractions, after dialysis, were tested for the presence of antibodies. It was found that all the antivenene principle was precipitated with the pseudoglobulin fraction.

W. R. WOOLDRIDGE.

I. KELLAWAY, C. H., & WILLIAMS, F. Eleanor. (1932). **Some Observations on Cellular Immunity to Snake Venom.**—*J. Path. Bact.* **35.** 193-197. 2 tables. [8 refs.]

II. Burnet, F. M., Kellaway, C. H., & Williams, F. Eleanor. (1932). **Cellular Immunity and Antibody in the Tissue Spaces.**—*Ibid.* 199-208. 4 tables. [10 refs.]

I. The authors carried out experiments upon the perfused auricles of rabbits immunized to cobra venom and thereby confirmed the observation of Gunn and Heathcote [(1921). *Proc. Roy. Soc. B.* **92.** 81.] that the perfused heart muscle of the immune is less susceptible than that of the normal rabbit to the action of this venom. They point out that the results of perfusion experiments may be valid for the demonstration of cellular resistance to poisons in natural antitoxic immunity, yet they are doubtful if it may afford conclusive evidence of acquired cellular immunity, for small amounts of immune serum added to the bath in which a normal isolated auricle was suspended caused it to behave with cobra venom like the auricle from an immune animal. It was therefore suggested that in the immune animal there might be an accumulation of antibody in the tissue spaces around the heart muscle cells which could not readily be removed by perfusion.

II. The second article is based on experiments carried out to determine whether this hypothesis was correct, and staphylococcal toxin was used as a reagent in the place of cobra venom. The main action of this toxin when injected intravenously into rabbits has previously been shown to be constriction of the vessels of the lungs with rise of pulmonary and fall in systemic pressure ; there is also constriction of the coronary vessels and rapid failure of the heart. This vaso-constrictor action of the toxin can be prevented if sufficient antitoxin is present and this has been used to determine whether the vessels of the heart and lungs of rabbits immunized against staphylococcus toxin behave with the toxin like the auricles of immune rabbits tested with cobra venom.

The experiments indicated that there is no evidence of any " tissue immunity " to staphylococcal toxin in those cells whose reactions are responsible for the rapid lethal effect of the toxin. The authors consider that there is evidence that, with the development of circulating antibodies, a certain amount appears in the perivascular tissues throughout the body. The rate at which this process takes place varies with the type of antibody, being slower with antitoxin than with agglutinin (based on experiments with *Bact. enteritidis*). As the antibody titre of the blood falls there is a progressive loss of extravascular antibody, the fall probably lagging somewhat behind that of the blood. The conclusion is therefore reached that because of this accumulation of antibody in the tissue spaces of immune animals possessing circulating antibody, coupled with the impossibility of its removal by perfusion, then the perfusion experiment cannot be used for the demonstration of antitoxic cellular immunity.

R. LOVELL.

Frobisher, M. (1931). **Results of Complement Fixation Tests with Yellow Fever Antigens.**—*J. Prevent. Med.* **5.** 65-78. 7 tables. [11 refs.]

Human beings or monkeys who have had yellow fever, or whose sera are protective, can be distinguished in about 90 per cent. of cases by the complement fixation test ; the fixative properties of such sera appear to be specific for yellow fever, and the optimum time for drawing sera from monkeys is 30 to 40 days after infection.

A second injection of virus into previously actively immunized monkeys stimulates the production of fixation bodies even in the absence of fever.

NORMAN HOLE.

I. Gengou, O. (1932). Contribution à l'étude de la lyse des cellules sanguines par la staphylotoxine. [**A Contribution to the Study of the Lysis of Blood Cells by Staphylotoxin**].—*Ann. Inst. Pasteur.* **48.** 19-26. [6 refs.]

II. Panayotatou, A. (1932). Contribution à l'étude du pouvoir hémolytique des Staphylocoques. [**A Contribution to the Study of the Haemolytic Power of Staphylococci**].—*C. R. Soc. Biol. Paris.* **109.** 194-195. 1 table. [1 ref.]

I. It is stated that after lysis of washed rabbit cells by staphylotoxin the following properties still remained :—the property of the leucocytes of transforming cholera vibrios into granules ; the power of the haematoblasts to give to the serum of the rabbit, after clotting, an intense bactericidal power for *B. anthracis* ; the participation of the haematoblasts in clotting ; and the power of the red cells to play a similar rôle by virtue of their cytozyme.

II. A table is given showing the results of haemolysin tests of four strains of staphylococci after incubation for from 2 to 22 hours. The optimum period of growth appeared to be from 4 to 7 hours.

A. W. STABLEFORTH.

I. Ferry, N. S., Norton, J. F., & Steele, A. H. (1931). **Studies of the Properties of Bouillon Filtrates of the Meningococcus : Production of a Soluble Toxin.**—*J. Immunol.* **21.** 293-312. 2 figs., 13 tables. [16 refs.]

II. Shwartzman, G. (1931). **Phenomenon of Local Skin Reactivity to Bacterial Filtrates : an Antibody Auxiliary to Serum Neutralization of Meningococcus Reacting Factors.**—*J. Exp. Med.* **54.** 711-723. 3 tables. [9 refs.]

I. Each of the four recognized types of meningococcus was grown in hormone broth (Huntoon) for four to six days ; during this period a heavy pellicle developed, but tended to fall. Filtrates from these cultures gave intradermal reactions in children in dilutions of 1 : 500 to 1 : 1,500.

From these tests and those of antibody production in rabbits it is concluded that each of the types produces extracellular toxin of a specific nature as well as a toxin common to all types. Experiments with autolysates and mechanically produced cellular extracts tended to support the view that the toxins were of extracellular origin.

II. " In this paper there is described an antibody auxiliary to the neutralization of meningococcus reacting factors. The presence of this antibody facilitates studies on the neutralizing potency of antimeningococcus sera. There is also reported a non-specific neutralizing factor of a heterologous immune serum which can be differentiated from specific neutralizing antibodies of antimeningococcus sera. Its nature and connection with the auxiliary antibody remain to be determined."

A. W. STABLEFORTH.

Aronson, J. D. (1931). **The Specific Cytotoxic Action of Tuberculin in Tissue Culture.**—*J. Exp. Med.* **54.** 387-397. 3 tables. [21 refs.]

These experiments were undertaken to determine whether there was a specificity discernible by tissue culture methods in the cytotoxic action of tuberculins prepared from different acid-fast bacteria. Fischer has reported that when tuberculin was added the fibroblasts from tuberculous chickens grew more rapidly than did cultures from normal chickens : Rich and Lewis, on the other hand,

stated that a human tuberculin inhibited the growth of cells from tuberculous guinea pigs, but had no effect on the tissues from normal animals.

In the present investigation, tuberculins prepared from human, bovine, avian and other acid-fast organisms were added to pieces of normal and tuberculous guinea pig tissues grown on coverslips in a plasma-embryo-extract medium. It was found that the mammalian tuberculins in dilutions of 1 : 15 to 1 : 120 inhibited the growth of cells from explants of tuberculous guinea pigs, but had no effect on similar tissues from non-tuberculous animals. Tuberculins from other acid-fast organisms showed no toxic action on cells from either batch of animals.

It was also noted that explants from tuberculous animals grown in plasma from normal guinea pigs were sensitive to the action of tuberculin, while tissues from non-tuberculous animals grown in plasma from tuberculous guinea pigs were not sensitized to tuberculin. It is suggested that tuberculin sensitivity is a cellular characteristic and cannot be passively transferred.

In contrast to the specific nature of the mammalian tuberculins on mammalian tissues, it was found that tuberculins from human, bovine, avian and certain other acid-fast strains inhibited the growth of explants from tuberculous chickens, but had no effect on similar tissues from normal birds.

R. E. GLOVER.

TODD, E. W. (1932). **Antigenic Streptococcal Hemolysin.**—*J. Exp. Med.* **55.** 267-280. 1 fig., 3 tables. [7 refs.]

From a comparison of streptolysin prepared in broth containing 20 per cent. of normal horse serum and in media containing yeast extract it is concluded that normal serum modifies the properties of the streptolysin causing delayed haemolysis, increased filtrability, resistance to oxidation and reduction, and absence of antigenicity. Streptolysin grown without serum, in the presence of yeast extract, is an active antigen and, although of lower titre, causes more rapid hæmolysis. It is nearly inactivated by filtration owing to oxidation and adsorption by the filter candle, unless special precautions are taken.

Similar temperatures are required to destroy the antigenic activity of serum-free lysin and the skin reactivity of Dick toxin. Scarlet fever antitoxin contains antistreptolysin which does not neutralize streptolysin grown in the presence of serum, but which can be detected by titration against serum-free streptolysin. This antilysin is species-specific, but not type-specific. Full details are given of the preparation of yeast extract, preparation, filtration and reduction of the antigenic streptolysin and of the titration of antistreptolysin.

A. W. STABLEFORTH.

I. SIMONIN, P., & JABELLION. (1931). La monocytose dans l'anaphylaxie expérimentale du lapin. La monocytose de choc. [**Monocytosis in Experimental Anaphylaxis in the Rabbit. The Monocytosis of Shock**].—*C. R. Soc. Biol. Paris.* **107.** 1155-1156. [3 refs.]

II. VALLERY-RADOT, P., MAURIC, G., & HUGO, A. (1931). Influence de l'hyperthermie et de l'hypothermie sur le choc anaphylactique du Lapin. [**The Effect of Raised and Lowered Temperatures on Anaphylactic Shock in the Rabbit**].—*Ibid.* **108.** 649-651.

III. VALLERY-RADOT, P., MAURIC, G., & HUGO, A. (1931). Interprétation du choc anaphylactique déterminé par l'injection d'un sérum d'homme sensibilisé à un lapin préparé avec la protéine sensibilisante. [**The**

Interpretation of Anaphylactic Shock determined by the Injection of a Sensitized Human Serum into a Rabbit prepared with the Sensitizing Protein].—*Ibid.* 878-879. [1 ref.]

IV. DUTHOIT, A. (1931). Etude comparative des résultats que donne l'anti-anaphylaxie pratiquée par les voies intradermique et sous-cutanée. [**A Comparative Study of the Results obtained in Anti-anaphylaxis practised by the Intradermal and Subcutaneous Routes**].—*Ibid.* 1264-1266.

I. Serum anaphylaxis in rabbits provokes a rapid and intense monocytosis, but the degree of the reaction appears to be independent of the severity of the shock. A similar blood reaction obtains when a normal rabbit is injected with a toxic protein. Horse serum only becomes proteo-toxic (as judged by "shock") after sensitization has occurred. It would therefore seem that monocytosis produced in this way is merely a manifestation of general organismal disturbance, and not a specific reaction.

II. The sphygmograph showed no anaphylactic shock when seven rabbits whose temperatures had been artificially reduced by 3° to 5° C. were reinoculated. Two rabbits out of five whose temperatures had been raised above normal showed a similar shock-immunity. This protection was found to last only for the duration of the abnormal temperature but, provided that the sensitizing dose thus administered was large enough, desensitization occurred.

III. These authors have previously shown that the serum of a man sensitized against a particular protein will provoke a shock when inoculated into a rabbit sensitized against the same protein. In this paper they seek to determine whether the reaction is one between antibody and antibody, or between antigen and antibody. They failed to provoke a shock in sensitized rabbits by the injection of serum from similarly sensitized rabbits and therefore conclude that the shock provoked by the human serum is probably due to the co-existence of antigen and antibody in the blood.

IV. Less severe anaphylactic shock occurs if guinea pigs inoculated with horse serum are desensitized by intradermal instead of by subcutaneous inoculations. Twelve inoculations of about 0·125 c.c. each were used. This desensitization was found to last only about five days, after which time fatal anaphylaxis sometimes occurred on reinoculation.

NORMAN HOLE.

SHWARTZMAN, G. (1931). **Phenomenon of Local Skin Reactivity to Bacterial Filtrates : Passive Immunity to Reacting Factors.**—*J. Exp. Med.* **54.** 1-10. 4 tables. [10 refs.]

It has been shown that the local skin reactivation which follows the intravenous inoculation of bacterial filtrates (Shwartzman phenomenon) can be specifically neutralized by an immune serum.

In this investigation rabbits injected intradermally with a toxic filtrate later received an intravenous injection of an immune serum followed by a dose of filtrate at intervals of $\frac{1}{2}$, $1\frac{1}{2}$ and $2\frac{1}{2}$ hours respectively with the object of determining whether it was possible to elicit a passive immunity to the reacting factors. *B. typhosus* filtrates and antisera were employed.

It was found that passive protection was best obtained when the immune serum was administered half an hour before the reacting factor. It was also possible to prevent the skin response by injecting the serum *after* the reacting factor, provided that the dose of serum was comparatively large (5 c.c. to 6 c.c.) and

that it was given immediately after the toxin : if a delay of 20 minutes or more ensued between the two injections, the skin reaction could not be inhibited. The experiments suggested that the greater the amount of the serum which was injected, the more efficient was the *in vivo* neutralization and that the reactions followed the law of multiple proportions.

R. E. GLOVER.

LUMSDEN, T. (1931). **Tumour Immunity.**—*Amer. J. Cancer.* **15.** 563-640. 33 figs., 6 tables. [37 refs.]

In vitro experiments have shown that animals are capable of forming antibodies which have a specific lethal effect upon malignant tumour cells of any variety, but are non-toxic to normal cells. It has been demonstrated that the serum of a rabbit which has been repeatedly inoculated with mouse cancer fragments may contain three factors which are toxic to cancer cells cultured *in vitro*. There is a heat-labile factor, naturally present in the sera of many adult rabbits, and toxic to any mouse cell ; a second factor, namely, anti-mouse-group bodies, is not specifically anti-malignant and is heat-stable ; the third factor consists of the anti-malignant cell bodies which are specific in the sense that they kill malignant cells and not normal tissues, but they are toxic to many varieties of malignant cells, not only to mouse cancer cells which in these experiments were used as the antigen. These antibodies are heat-stable and resist 56° C. for several hours.

In vivo experiments were carried out to study the effects of implantation of tumour cells into a fresh host and it is maintained that there is present in animals a first line of defence as shown by the fact that, if mouse cancer cells are implanted into a rabbit or sheep, they are rapidly destroyed by the naturally existent toxic factors. If on the other hand these tumour cells are injected into an animal of closely allied species, e.g. rat, they are less seriously damaged. In fact they survive and proliferate for some days until the rat has time to mobilize its second and specialized defence force of anti-mouse-cancer bodies and trained leucocytes. Both factors appear to be necessary to destroy the tumour cells. If mouse cancer cells are implanted into a mouse, the existing defence mechanism is not an effective means of destroying them. They grow freely and absorb any antibodies as soon as they are produced. If, however, the tumour is treated, e.g. by injection of 1 per cent. formalin, then some of the cancer cells can be destroyed in such a way as to act as a vaccine ; the tumour then regressses and the mouse's serum contains anti-malignant-cell bodies. The capacity to form these antibodies persists in the cured mouse so that it is now immune to a fresh inoculation of the tumour in any part of its body. Further *in vivo* experiments showed that subcutaneous injection of antiserum into rats in which a tumour was growing had no appreciable effect unless steps were taken to retain the antiserum locally for some hours. When the circulation in a foot was shut off by constriction of the ankle with a rubber band for two to three hours and the antiserum was injected into a tumour of the foot, then in almost every case the tumour regressed. Regression of the treated tumour is invariably followed by regression of a similar tumour as on the other hind foot and the animal (in this case the rat) is thereafter immune to a test inoculation into the flank. It would thus appear that, during gradual cure by local treatment with either antiserum or formalin, the attenuated and dying tumour cells function as a vaccine and actively immunize the animal. This mechanism is called by the author " autovaccination."

The author states that the most hopeful means of attaining the " cure " of cancer appears to be :—(1) to inoculate antiserum into the primary cancer (or the

arteries supplying it), localizing it there by constriction or adrenalin and (2) if necessary thereafter to complete by surgery or radiation the local destruction of the tumour.

The ideal method appears not only to destroy the tumour, but also to induce some mechanism which shall prevent recurrence.

R. LOVELL.

PUBLIC HEALTH.

LEIGHTON, G. (1931). **Public Abattoirs ; their Construction, Equipment and Administration.**—*Surveyor.* **80.** 260.

This is a short article outlining the principles of slaughter-house construction and management.

J. E.

FERGUSON, G. H. (1931). **Refrigeration and its Health Aspect.**—*Canad. Publ. Health J.* **22.** 467-473.

The author refers to the preservation of foods during the times of plenty in order to avoid famine when scarcity arises and states that chemical processes in animal and vegetable tissue continue active in foods after evidence of life has gone. In order to restrain such activity, various methods have been adopted such as drying, dehydrating, smoking, pickling, curing, preserving and cooking, the most important being refrigeration which causes least alteration of the food properties and retains flavour and freshness. Refrigeration is a modern method of preservation ; it has only been 50 years in operation, but its uses in international trade have already affected the destinies of nations, as was shown during the Great War.

The numbers of refrigerating media are various, e.g. ammonia, carbon dioxide, sulphur dioxide, ethyl chloride, methyl chloride, butane, propane, ethane, isobutane, nitrous oxide, ether, carbon bisulphide, chloroform, carbon tetrachloride, dieline and trieline.

Of these, carbon dioxide, sulphur dioxide, carbon tetrachloride and nitrous oxide are non-inflammable. Some of the media are described in detail. Special attention is given to the " absorption system of producing refrigeration." There is a growing demand for absorption units for transport and domestic use for the refrigeration of small quantities of material. " Silica gel " made of sodium silicate is now being used for (1) cooling refrigerator cars and (2) refrigeration in rural homes and dairies. Details are given of household refrigeration, the construction of cabinets, the non-conductors of heat and the necessity for using materials which are harmless either to the food in the cabinet or to the members of the household.

A careful search must be made for leaks, which may be caused by sharp instruments such as knives, as deaths and lasting injury to health have occurred from leakage of gases. Great benefits to the public have been derived from refrigeration, but at the same time mechanical refrigeration has created a new and serious public health problem for public health engineers to handle.

T. DUNLOP YOUNG.

REISINGER, M. C. (1931). De Beteekenis van de Zuurgraad-Bepaling van Vleesch. **[The Significance of the Determination of the Degree of Acidity of Meat].**—*Tijdschr. Diergeneesk.* **58.** 747-749. 1 table.

The author gives a tabular statement of the changes in reaction of extracts of meat from a series of diseased carcasses. He concludes that the determination of the pH is an excellent method for detecting the onset of putrefaction.

A. LESLIE SHEATHER.

VAN OIJEN, C. F., & MOLANUS, B. H. (1931). Colorimetrische Bepaling der pH van Vleeschextracten. [**The Colorimetric Determination of the Reaction of Meat Extracts**].—*Tijdschr. Diergeneesk.* **58.** 849-855.

Ten grammes of minced meat are soaked for half an hour in 100 c.c. of cold recently boiled distilled water. After filtration the pH is determined by the Michaelis-Walpole method.

The Hellige disc-comparator is not suitable.

A. LESLIE SHEATHER.

RENNES, M. J. (1931). Vers le lait propre et sain. [**Towards Clean and Healthy Milk**].—*Le Mouvement sanitaire.* **81.** 41-46.

The author points out that commercial milk is not always above reproach and indicates seven classes of defects. These are :—(1) milk wrongly described such as milk of an animal other than the cow ; (2) milk wrongly labelled such as skimmed milk sold as fresh ; (3) milk fraudulently sold as " produced under control " when it is not ; (4) milk adulterated by water or otherwise ; (5) milk unfit for consumption as that from diseased cows or to which colouring matter has been added ; (6) milk contaminated by toxic organisms and (7) milk of depreciated value not coming under any of the previous headings, for instance, milk heated once or twice or milk from cows suffering from diseases other than those included in the scheduled list.

The author then discusses what should be done to improve the milk supply, but points out that improvements cannot be brought about without an increase in the price, a fact which the public resolutely refuses to accept. He shows that workers in public health should study the economics of the milk trade and then gives a scheme for the control of milk in France. The paper was written with a view to petitioning the French Minister of Agriculture to make an Order stating what animal diseases render milk unfit for food and to make suitable regulations for the control of the milk supply in France.

D. S. RABAGLIATI.

I. EVANS, W. A. (1932). **The Advantages and Disadvantages of Pasteurization of All City Milk.**—*J. Amer. Vet. Med. Ass.* **80.** 370-375.

II. GILTNER, W. (1932). **Why Certified Milk ?**—*Ibid.* 375-379.

III. WILLIAMS, R. Stenhouse. (1931). **The Clean Milk Problem.**—*Lancet.* **220.** 1211. [5 refs.]

I. This is a paper read before the United States Live Stock Sanitary Association. The author speaks from the point of view of " How does a person who isn't an official estimate the present position of men in an official position, as to whether all milk sold in the community for human consumption should be pasteurised ? " The question presupposes that pasteurization is advantageous. It is pointed out that Chicago has 24 years of experience, New York 18, scores of other cities more than ten years and hundreds approaching ten years.

The compulsory pasteurization of all milk would bring to an end the production of certified milk. The author points out the great benefit the certified milk producers have been to the people and states that there is nowhere in America an illustration of what an industry can do in the way of self-control, except the certified milk industry. While he argues that pasteurized milk is the safest milk, he shows that the disadvantages of pasteurizing certified milk would outweigh its advantages.

II. This paper, read before the 35th annual meeting of the United States Live Stock Association, is a eulogy of certified milk producers and their product—certified milk. The author deplores that so little milk is used by the poor and economically depressed. He points out that there is no widespread demand for a narrowly standardized milk, and almost without dissent we must accept graded milk. The grades must differ in some respects, and although they may differ in quality they must not differ in safety—by this he means the absence of living pathogens. A definition of certified milk is virtually a definition of what may be considered as nearly ideal raw milk as is practicable. The amount available is so limited that it plays quantitatively a negligible rôle in the milk supply of the people.

The author believes in pasteurization, but is unalterably opposed to commending the pasteurization of a low grade milk or substituting pasteurization for the more logical methods of handling infectious diseases of cattle and human carriers of pathogens. He would even recommend the pasteurization of certified milk under certain circumstances. Any movement in the direction of substituting pasteurization for either standards of quality or standards of safeness is in the wrong direction.

III. In a letter to the Editor, the author refers to the advice of SAVAGE that large local authorities should be empowered " to require all milk produced or consumed in or entering their area, other than certified or Grade A (T.T.) milk, to be pasteurised." He points out that this would mean that only an infinitesimal quantity of fresh milk would be available and suggests that in view of the great improvements now being carried out by the dairy industry under a voluntary system, and the necessity for a much more thorough study of the nutritional value of different kinds of milk, it would appear that a much less drastic procedure is indicated.

He refers to the Lanarkshire experiment on school children and calls for a complete study of the nutritional values of different milks, emphasizing that any legislation that may be passed should ensure the progress of the production of a clean milk which is free from disease and not be limited to regulations which would tend to reduce the supplies of fresh milk. This has been the effect of compulsory pasteurization in all those countries which have adopted it.

D. S. RABAGLIATI.

I. EHRLICH. (1931). Die Bedeutung der Trommsdorffschen Milcheiterprobe als Schnelluntersuchungs Methode. [**The Significance of the Trommsdorff Test as a Rapid Method of examining Milk**].—*Molk. Ztg.* **45.** 585-587. 3 figs.

II. MÜNCHBERG, F. (1931). Die Brauchbarkeit der Thybromol-Katalaseprobe zur Erkennung von Eutererkrankungen. [**The Usefulness of the Thybromol-Catalase Test for the Recognition of Udder Disease**].—*Milch. Zlb.* **60.** 81-83.

I. The author believes that the Trommsdorff test is the best rapid method of recognizing the amount and nature of the cell content of milk and that, by its

use, every producer can protect himself against possible objection to his milk on the grounds that it contains mastitis secretion. The test can be carried out in 25 c.c. tubes in the centrifuge ordinarily used for fat estimations, more than one part of sediment in 2,000 parts of milk being regarded as indicative of disturbance. Sediments of less than one half this volume are seldom positive microscopically.

II. The combined thybromol-catalase test is not of greater value than the tests for chlorides and electrical conductivity. In 174 (70 per cent.) out of 252 cases examined it gave results in agreement with those of other tests. It can only be regarded as a preliminary test but, as such, is of value to the practising veterinary surgeon in the control of udder disease.

A. W. STABLEFORTH.

I. EDWARDS, S. J. (1931). **A Selective Medium for the Cultivation of Streptococci from Milk Samples.**—*Proc. Roy. Soc. Med.* **24**. 1369-1370.

II. UDALL, D. H. (1932). **Bovine Mastitis.**—*North Amer. Vet.* **13**. No. 1. 4.

I. A preliminary note on a selective medium for the cultivation of streptococci from milk samples, the primary advantage of which is its superiority over blood-agar in the detection of small numbers of these organisms, particularly if they are non-haemolytic. The medium consists of meat infusion broth at pH 7·4 with 1 per cent. glucose, and 5 per cent. serum, to which is added crystal violet, 1 : 200,000, in order to check the growth of staphylococci and certain other organisms.

II. In an address to the Nebraska Veterinary Medical Association it is stated that a careful clinical examination combined with a test for reaction (thybromol) is sufficient to detect mastitis in lactating animals and that, in the work at the clinic of Cornell University, the streptococcus of mastitis was not found in animals which were free from mastitis.

Frequent milking and hot fomentations are regarded as the most useful methods of treatment.

[The views expressed in the first paragraph are in marked contrast to those of most workers on this subject. It is now generally accepted that a large number of cows are infected with potentially pathogenic streptococci of mastitis type without evincing any sign of clinical disturbance, and in many cases without alteration in the pH of the milk].

A. W. STABLEFORTH.

KOENIG, N. E. (1931). **Poultry Inspection.**—*Cornell Vet.* **21**. 334-343.

The article deals with American trade in poultry and the duties of the veterinary inspectors. Consignments of live poultry are inspected on arrival in New York and birds showing any of the following symptoms are destroyed at the time of unloading :—sneezing or coughing, lethargy, inability to eat, emaciation and unthriftiness with or without signs of anaemia, fractures, extensive wounds, prolapsed rectum, dropped abdomen, impacted crop, necrosis around the mouth or comb, twisted necks, and foul discharges around the cloaca.

R. S. ROBERTS.

POISONS AND POISONING.

FINNEMORE, H. (1931). **The Poisoning of Stock on the Georgina River. The Native Fuchsia and Gidgea.**—*J. Sci. & Indust. Res. Australia.* **4.** 220-224. [4 refs.]

The work on this subject was performed jointly by the University of Sydney and by the Poison Plant Committee of the Council for Scientific and Industrial Research. The author is associated with both these bodies being chairman of the committee.

Losses in livestock have occurred for many years along the valley of the Georgina river, North Queensland, and the local inhabitants have blamed the native fuchsia (*Eremophila maculata*) and gidgea (*Acacia georgina*), but stock have been known to eat gidgea pods without suffering ill effects. The investigations carried out provided an explanation of this apparent discrepancy.

The toxic principle of the fuchsia plant is a cyanogenetic glucoside which is present in a higher proportion than is found in any other known Australian plants, namely, 8 to 10 per cent. The gidgea plant possesses a considerable amount of saponin, but the author emphasizes the fact that this need not be poisonous in itself.

In hydrocyanic acid poisoning from the ingestion of a cyanogenetic glucoside the presence of an enzyme is necessary. The enzyme is actually present in a small but inconsistant amount in the fuchsia plant, but it also occurs in other plants and it is in this factor that the fuchsia and gidgea are toxicologically related. The enzyme is present in the gidgea plant to a sufficient extent to liberate hydrocyanic acid from the fuchsia when infusions of the two are mixed.

This action appears to be favoured *in vivo* if the animal drinks water.

These preliminary researches lead to the strong suggestion that the poisoning observed is due to the combined presence of these two plants in the animal's stomach at the same time.

J. E.

GILRUTH, J. A., & MURNANE, D. (1931). *Sarcostemma Australe* (**Caustic Vine**) **: A Plant that is Poisonous to Stock.**—*J. Sci. & Indust. Res. Australia.* **4.** 225-231. [8 refs.]

This detailed account is supplementary to a preliminary one previously published [see this *Bulletin*. **1.** 173.] and is set out systematically.

The introduction deals with poisoning by the natural order Asclepiadaceae, which contains the caustic vine and numerous other species. Among them the milkweeds are known to be poisonous, particularly some American species of *Asclepias*.

S. australe is a leafless fleshy climbing plant with a bitter milky juice and is commonly found hanging from trees.

The plant was tested for toxicity by dosing ten sheep, a bull, a horse, four guinea pigs, two rabbits and a fowl with pulped plant or with extracts. The results are described in detail. Sheep are killed by a minimum dose of two ounces of the vine : after the onset of symptoms they are unable to stand ; they live for a time during which they struggle periodically, show opisthotonus, dyspnoea, gastric tympany and profuse salivation. Lesions are limited to petechiae on serous membranes. The symptoms were similar in the other susceptible animals.

In an attempt to isolate the toxic principle of caustic vine, a petroleum ether extract and an alcoholic extract were prepared. The latter produced the same toxic effect as the entire plant, whilst the former was harmless when tested on sheep.

J. E.

TEETZMANN. (1931). Eiweissvergiftung der Hennen—die Ursache des Absterbens der Kücken im Ei. [**Protein Poisoning in Hens—the Cause of the Death of the Embryo in the Egg**].—*Deuts. Landwts. Geflügel-Ztg.* **34.** 913-914.

In certain cases of death of chick embryos and in the absence of demonstrable bacterial and fungous causation, the author puts forward the proposal that these deaths may originate from decomposition of protein in the hen's food. Such a change is said to occur in connection with fish meal. No evidence is given in support of this hypothesis.

J. E.

I. SCHMOKER, E. A. (1932). **Toxic Proteins.**—*North Amer. Vet.* **13.** No. 5. 46-48.

II. CHAPMAN, W. B. (1931). **Protein Poisoning in Swine.**—*J. Amer. Vet. Med. Ass.* **79.** 641-642.

I. The author attempts to explain certain disease conditions, commonly encountered in small animal practice, as a toxaemia resulting from the absorbtion of harmful proteins. He quotes at length in his article from VAUGHAN'S book "Poisonous Proteins," but his conclusions are only tentative.

II. The author describes disorders in two large herds of pigs in which, after previous dry feeding, illness occurred following access to fresh alfalfa and clover respectively.

The animals showed anorexia, prostration and laminitis and in many there was a high temperature and respiratory distress : *post-mortem* examination of one pig showed congestion of the lungs and lymph glands and petechiae on serous membranes. Purgative treatment and dietary restriction effected a cure.

Such a condition requires to be differentiated from specific septicaemias, particularly from swine fever. The laminitis is said to be a valuable factor for diagnosis.

J. E.

THERAPEUTICS.

I. HYPOLITE, J. (1931). L'opothérapie placentaire en Médecine vétérinaire. [**Placental Organotherapy in Veterinary Medicine**].—*Thesis for Docteur vétérinaire, Lyon.* 39 pp. [38 refs.]

II. JAKEMAN, H. W. (1931). **Glandular Therapy in Veterinary Practice.**—*Vet. Med.* **26.** 502-504.

I. This interesting thesis deals with the foetal placenta in many of its aspects including the anatomical and physiological ; it also deals with the relationship to other genital organs, and with the use of therapeutical extracts of placenta.

It is now known that inorganic salts, amino-acids, etc. can traverse the

placenta as also can certain bacteria, but the exact way this occurs is not clear. The passage may be purely as through a filter or the organ may possibly act as a gland. Toxins and hormones pass from mother to foetus. The placental ferments, of which about six have been discovered, are here considered.

The action of injections of whole placental extract has been much studied and the summarized results show that it has a stimulating effect on the mammary gland and female genital tract. The placenta causes an enlargement of the mammae during gestation, but inhibits actual lactation : lactation normally only occurs when the placenta is ejected at parturition.

The author employed placental extract subcutaneously in two mares and two heifers (all primiparae), which failed to lactate after parturition. The dosage for the mares was 10 g. over four days then 5 g. over four days (15 g. over eight days) and for the heifers 8 g. over eight days. In each case a marked increase in milk secretion is said to have followed, but it was not possible to obtain any comparative measurements.

II. This is a paper from the viewpoint of general practice. The author advocates a wider use of gland preparations, giving his indications for the use of extracts of parathyroid, pituitary, thyroid and adrenal glands. The use of spleen extract is also considered with regard to skin disease.

J. E.

PHYSIOLOGY.

ANDERSEN, Dorothy H. (1932). **The Relationship between the Thymus and Reproduction.**—*Physiol. Rev.* **12.** 1-22. [101 refs.]

This paper is a very complete review of previous investigations on the relationship between the thymus and reproduction. The matter is discussed under the following headings :—thymus weight during various phases of sexual life ; the effect of extirpation of the testes and ovaries on the thymus ; the effect of thymectomy on the sex glands ; the effect of the administration of thymus substance on the gonads ; and the effect of adult gonads or blood serum on the thymus. Finally, the author makes a comment on the criteria of experiments on the thymus and gonads in view of the fact that the great majority of the experiments covered by the review have been carried out in such a way as to make the conclusions worthless.

The main conclusions of the review are as follows :—the thymus increases in size until puberty when it undergoes involution ; the microscopic picture is typical in the various age periods ; during involution there is decrease in cortex and to a lesser extent in the medulla, with fat and connective tissue replacement. The normal age involution is hastened by mating, pregnancy and lactation ; there may be regeneration after pregnancy. Castration or spaying of young animals delays, but does not prevent, age involution ; as far as has been demonstrated, thymectomy has no effect on the morphology or physiology of reproduction except through trauma or infection from the operation.

The administration of thymus gland has no specific effect on reproduction other than that of a good food ; neither has the administration of thymus extract. The transplantation of adult gonads into young animals probably hastens age involution and the injection of adult blood serum into young animals may hasten it.

J. R. M. INNES.

BOLTON, C., & GOODHART, G. W. (1931). **The Variations in the Acidity of the Gastric Juice during Secretion.**—*J. Physiol.* **73.** 115-135. 3 figs., 6 tables. [5 refs.]

A series of experiments were carried out on cats, decerebrated or ether-anaesthetized, in order to enquire into the degree and causes of variations in the acidity of the gastric juice. The whole stomach was used in each experiment, the cardiac and pyloric orifices being occluded by ligature. A cannula was tied in and this was wide enough to facilitate the mopping out of the stomach by a cotton wool plug. The gastric glands were excited to secretion by the administration of pilocarpine or histamine and the juice was withdrawn by aspiration through a rubber tubing and syringe. Each animal was used for one experiment only.

The volume of gastric juice secreted usually increases rapidly during the first half an hour and then, after remaining a short time at a maximum, it decreases in amount and becomes practically negligible, as a rule, after two hours. The acidity of the juice is initially somewhat low, but at the height of secretion and afterwards it remains practically constant, corresponding approximately to 0·49 per cent. hydrochloric acid. The inorganic chloride is about 0·07 per cent. The final dimunition in volume of the juice is accompanied by only a negligible reduction in acidity. The total amount of chloride in the juice varied little from animal to animal, but some gave acidity values less than 0·49 per cent. with a correspondingly greater value for neutral chloride. The authors suggest that the lower acidity value at the beginning of secretion results from a variable escape of neutral chloride at the expense of acid and from the effect of admixture with mucus. Pure mucus was obtained by administering olive oil, ether or pilocarpine after paralysis of the gastric secretory nerve ends with atropine. The more usual methods adopted were found to cause a mixed secretion. The mucus is alkaline in reaction and contains 0·28 to 0·36 per cent. neutral chloride and up to 0.5 per cent. with strong stimulation.

The unaided stomach has no means of lowering the acidity of the gastric juice secreted into it unless the volume of the latter has diminished to a minute quantity at the end of secretion, and even then there is no great reduction in acidity until the secretion has actually stopped. The effect when produced is due to alkaline mucus secreted by the stomach.

The gastric secretion continued with undiminished acidity although it was allowed to accumulate in the stomach. The hypothesis that the presence of a certain concentration of acid in the stomach inhibits the further secretion of acid is therefore disproved.

W. R. WOOLDRIDGE.

RAWLINSON, H. E. (1931). **The Later Development of the Sinus Venosus and the Relation of the Sino-atrial Node to it, in the Calf Heart.**—*Anat. Rec.* **49.** 89-95. 4 figs. on 1 plate. [5 refs.]

This paper concerns the development of the calf heart to determine the relation of the sino-atrial node to the *sinus venosus*. The elements of the auricular septum in calf embryos of from 30 to 60 mm. are described. The *septum secundum* appears as a definite structure in 60 mm. embryos. It has nothing to do with the *septum spurium* and the *crista terminalis*, both of which lie above and apart from the *septum secundum*. The sino-atrial node is present at 90 to 100 mm., lying on the ventral wall of the superior *vena cava* just above the line where the vein reaches the heart. The nodal tissue is in continuity with the *crista terminalis*

to the right and with the inter-atrial muscle bundles of Papez on the left. The structure lies above the *septum spurium* and can therefore be assigned to the sino-atrial junction.

J. R. M. INNES.

PINCUS, G., & FISCHER, A. (1931). **The Growth and Death of Tissue Cultures Exposed to Supranormal Temperatures.**—*J. Exp. Med.* **54.** 323-332. 2 figs. on 1 plate, 1 table, 5 charts. [10 refs.]

The material utilized for these experiments consisted of pure cultures of chick osteoblasts which were ordinarily grown in blood plasma and embryo extract in Carrel flasks. Measurements were taken from three to eight days after the initial transplantation.

The cultures were exposed to temperatures of 42°, 44°, 47°, 50° and 52° C. respectively. At 42° C. the cells continued to multiply as actively as controls at 39° C., although after 30 hours there was some retardation in the rate of growth. When the temperature was raised to 47° C., the cultures always died when exposed for 1½ hours : an exposure of less than 30 minutes resulted in no detectable inhibition of growth. At the higher temperatures of 50° C. and 52° C., the times required to bring about lethal effects were reduced to five to six minutes and two to three minutes respectively.

It was noted that there was a latent period of 24 hours before the effects of sublethal or just lethal exposures were discernible. The authors were unable to decide whether the augmentation of the temperature involved the death of increasing numbers of cells or the destruction of a substance necessary for cell growth, although it was demonstrated that embryonic juice heated to 50° C. for seven minutes was still capable of supporting normal growth of tissues.

R. E. GLOVER.

GUHA, B. C. (1932). **The Synthesis of Vitamin B_1 and "Bios" by** *Bacillus vulgatus*.—*Ind. J. Med. Res.* **19.** 977-983. 3 tables. [12 refs.]

Bacillus vulgatus, grown on simple synthetic media, will synthesize both vitamin B_1 and bios. The addition of histidine to the medium does not increase the yield of vitamin. The latter appears to be formed and retained within the cell and so this method of production does not yield a source of vitamin which would offer advantages over other sources as a starting point for its chemical purification.

W. R. WOOLDRIDGE.

TECHNIQUE.

I. CHRISTOPHERS, S. R., & CRAIGHEAD, A. C. (1932). **The Diffraction (Halometric) Method of determining the Average Diameter of Red Blood Corpuscles.**—*Ind. J. Med. Res.* **19.** 963-976. 4 figs., 2 tables. [18 refs.]

II. SAVAGE, A., & ISA, J. M. (1931). **The Use of the Projection Microscope and Photo-electric Cell. II. Blood Studies.**—*Canad. J. Res.* **5.** 544-549. 2 text figs., 4 figs. on 1 plate. 5 tables. [4 refs.]

I. The diffraction method of determining the average diameter of red blood corpuscles is modified so that it may be used in the examination of wet

blood smears. A fairly simple apparatus is described consisting of a source of light, a screen, a collimator lens, a plane mirror, a microscope and a No. 1 eyepiece fitted with micrometer. Blood, taken from the finger, is diluted about 1 in 100 or 1 in 200 by means of previously prepared serum obtained from the same case, and a small drop of this diluted blood is placed in the cell of a microscopic slide and covered with an ordinary thin coverslip. After a minute or two the cells will have settled down sufficiently for the taking of a reading and rouleaux formation will not yet have taken place. By adjustment of a lens the focussing of the necessary diffraction rings on a screen can be effected and from a formula, developed from principles of optics, the size of the corpuscles can be deduced. It appears that dried preparations of blood in most instances will give results only slightly different from those of wet preparations.

II. In a previous paper [Savage & Jamieson. (1930). *Canad. J. Res.* **3.** 322.] it was indicated that by the combined use of the projection microscope and the photo-electric cell it is possible to determine the comparative areas of certain microscopic images more quickly and more easily than by other methods. In this paper the method is modified by using a thermionic valve so that increased magnification is obtained and it is applied to a study of red blood cells stained with basic fuchsin. For the method to be successful the cells must be separated from each other by a distance several times that of their own diameter. The measurements recorded depend on area and on staining intensity and it is shown that the latter is the greater variant. This is particularly noticeable when dealing with anaemic blood.

W. R. WOOLDRIDGE.

Neumann-Kleinpaul, K. (1932). Cystoskop für Grosstiere. [**Cystoscope for large Animals**].—*Arch. wiss. prakt. Tierhlk.* **64**. 503. 1 fig. [1 ref.]

Neumann-Kleinpaul, K., & Gerant, E. (1932). Ueber die Cystoskopie bei der Stute. [**On Cystoscopy in the Mare**].—*Ibid.* 504-509. 3 figs. [11 refs.]

For endoscopy in large animals it has hitherto been usual to employ an instrument on the principle of the rhino-laryngoscope with the source of illumination at the observer's end. Professor Neumann-Kleinpaul has now had a new cystoscope constructed with a light at the distal end. The picture from the illuminated field is reflected by a mirror along the observation tube to the eye piece and, by moving the tube in and out, the mirror is deflected slightly so that a visual angle with a maximum of 120° is obtainable.

The second paper describes the clinical use of this instrument which offers a wider field of view than does Frese's rhino-laryngoscope used for the same purpose by Cliza [see this *Bulletin*. **1.** 324]. The bladder is filled with clear warm water (2 to 3 litres) before the instrument is inserted. Until some experience is acquired it is difficult to differentiate the ureteral openings from the bladder wall, but a skilled observer has no difficulty in this respect. An air bubble is usually present at the roof of the bladder and hinders the view, but this difficulty can be minimized if the bladder is carefully filled with the water. The technique for the systematic examination of the bladder is described including the method of observing the entry of urine after the injection of carmine which is excreted by the kidneys.

J. E.

MISCELLANEOUS.

McClean, D. (1931). **Further Observations on Testicular Extract and its Effect upon Tissue Permeability.**—*J. Path. Bact.* **34**. 459-470. 6 tables. [6 refs.]

It has previously been shown that testicular extract enhances the lesions produced by intradermal inoculation of vaccine virus and that it also increases the permeability of the dermis, so that there is a diffusion of the inoculum through an increased area. The present paper deals with further observations and it is shown that the increased permeability is not dependent upon any active vascular or nervous response in the injected animal. The increased permeability was shown to occur in skin removed from an animal forty-eight hours previously. The active substance has not yet been isolated. Similar effects may be demonstrated by the use of protamine salts such as clupeine sulphate, and also by extracts of spermatozoa.

It is suggested that the phenomenon may be connected with the germinal activity of the testicle and preliminary observations on the effect of these extracts on ova indicate that the active substance may be associated with the sudden change in permeability occurring in ova on fertilization.

The activity of the extract is destroyed by trypsin. The extract resists peptic digestion at pH 5·0 without loss of activity ; there is, however, some peptic activity at this pH, but it is insufficient to remove all coagulable proteins. It is not known whether the extract would resist complete peptic digestion.

In a previous paper it had been reported that solutions of protamine salts such as clupeine sulphate inhibited the lesions of vaccine virus notwithstanding their power to increase the dermal permeability in a manner similar to testicular extract. The effect of such salts on the growth of bacteria in culture was examined and it was shown that clupeine sulphate inhibited the growth of *Bact. typosum*. The author suggests further investigation on the action of these salts on the *in vivo* proliferation of virus, and the *in vitro* multiplication of bacteria.

R. LOVELL.

REPORTS.

—. (1931). Bericht der Abortuskommission der Gesellschaft Schweizerischer Tierärzte an das Eidg. Veterinäramt in Bern. **[Report of the Abortion Commission of the Society of Swiss Veterinary Surgeons at the Federal Veterinary Office at Bern].**—*Schweiz Arch. Tierhlk.* **73**. 529-536. 5 tables.

—. (1931). Rapport de la Commission de la Société des vétérinaires suisses pour la lutte contre l'avortement épizootique des bovidés. **[Report of the Commission of the Swiss Veterinary Society on the Campaign against Bovine Epizootic Abortion].**—*Bull. Off. internat. Epiz.* **5**. 664-669.

The second article is practically identical with the first.

This report includes the statements of five individual diagnostic institutes which have been conducting enquiries into the incidence of bovine contagious abortion in Switzerland.

The material was collected from owners who were willing to allow the Commission to investigate the incidence of the disease in their herds.

The enquiry was organized systematically and the results are set out in tabular form under the following headings :—the number and proportion of infected and non-infected farms, the mode of infection in the cases diagnosed, the results of serological and of bacteriological diagnoses and the results of various methods of treatment.

Bovine contagious abortion was found to be widespread in Switzerland, and the agglutination test was found to be suitable for its diagnosis. No marked superiority was shown by any one method of treatment—the use of vaccines in chemotherapy, local applications, etc., was condemned in all except infected herds.

J. E.

MIESSNER, H., & KÖSER, A. (1931). 7. und 8. Sammelbericht der Reichszentrale für die Bekämpfung der Aufzuchtkrankheiten für die Zeit vom 1. April 1929 bis 31. März 1931. **[The 7th and 8th Reports of the Imperial Centre (Germany) for Combating Diseases of Breeding Animals for the period 1st April 1929 to 31st March 1931].**—*Deuts. tierärztl. Wschr.* **39.** 693-697 and 711-714.

This systematic biennial report consists of six main sections each devoted to the diseases of particular animals.

I. DISEASES OF HORSES.

A. STERILITY.—1,265 mares were examined, but proper bacteriological tests were only possible in a minority of cases; salmonella organisms were commonest in those dealt with. The cause of sterility was ascribed to dry uterine catarrh in most cases and the use of weak antiseptic uterine douches gave the best results. GÖTZE's uterine catheter is said to be useful for obtaining uncontaminated uterine secretion.

B. ABORTION.—219 foetuses, 2,698 blood samples, 478 uterine and 10 vaginal exudates and 32 placentas were examined. Except for one stud at Königsberg (where a mixed infection was found) infection with *B. abortus equi* was not demonstrated at all—a happy circumstance. [The total number of actual abortions is not clear in the original]. 601 blood tests gave a positive agglutination reaction to *B. abortus equi*, but this is stated to be partly due to previous vaccination with the organism (up to 12 months previously). Most abortions noted were considered to be due to causes other than bacterial infection.

C. FOAL DISEASES.—Material from 443 cadavers was examined and the following organisms were found, the relative frequency being in the order given :—streptococci, *B. pyosepticum*, *B. coli*, micrococci, *Corynebact. pyogenes equi*, *B. abortus equi*, *B. enteritidis breslaviense*, *B. proteus* and *Streptococcus equi*; disease due to gross parasites was also observed. 105 deaths were considered to be unrelated to bacterial invasion. The first two of the bacteria named above accounted for half of all the deaths. Foal infections are discussed at some length in the report.

II. DISEASES OF CATTLE.

A. STERILITY.—No less than 223,458 cattle were examined—an indication of the extent to which the work of the department is appreciated by cattle owners. Uterine disease was considered to be the cause in a large majority of cases and is said to be due to an important degree to dietetic errors leading to endocrine dysfunction and disturbed metabolism. Most of the institutes in the department declared that sterility was as common in herds free from contagious abortion as in affected ones. The use of natural pastures, mineral mixtures and uterine irrigation with dijosol or Lugol's iodine etc. is recommended for dealing with these conditions. The enucleation of persistent *corpora lutea* is recommended except during the period of 10 days after *oestrum*.

B. Abortion.—A long report on *Br. abortus* infection is given and about 20 per cent. of German cattle herds are said to be infected. Less than half the material from abortions was, however, infected with this organism. Karsten recommends the combined use of blood and whey for agglutination tests. *Br. abortus* may be excreted in the milk whilst the blood test is negative or doubtful ; in such cases a whey test provides a correct diagnosis.

The use of dead vaccine is condemned as useless ; the live vaccine should only be used on non-pregnant animals. Heifers should not be put to the bull for 6 to 12 weeks after the last vaccination. Attempts at chemotherapy all failed to offer any hope of success.

C. Calf Diseases.—6,923 laboratory examinations were made. *Bact. coli* was incriminated in about half of all calf infections and *Bact. enteritidis* Gärtner in about 10 per cent. Other bacteria found were streptococci (7 per cent.), *B. bipolaris* (5·5 per cent.), *B. enteritidis breslaviense* (0·3 per cent.) ; the bacillus of calf diphtheria (1·5 per cent.) and *B. pyogenes* (0·7 per cent.). Further details of these infections are given in the original.

B. coli diarrhoea in calves is said to be prevented by putting the dam on dry food, by giving gastric astringents to the calves and by the use of autogenous vaccines on the calves.

III. Diseases of Sheep.

A. Sterility.—This was so rare as to be of no significance.

B. Abortion.—222 examinations were made and in 23 per cent. the *B. abortus ovis* was incriminated. *Br. abortus* was only found in eight cases. The large majority of ovine abortions were unrelated to bacterial infection and were considered to be chiefly of dietetic origin.

C. Lamb Diseases.—About half of all examinations showed a specific infection and, of these, infectious pneumonia (*B. bipolare ovisepticum*) was the commonest (43 per cent.). Other organisms isolated from cases of pneumonia were *B. pyogenes*, streptococci and the bacillus of Dammann-Freese. These showed some local peculiarities in incidence. *B. coli* was common (23 per cent.). Anaerobes were found in fattening lambs to a small extent. Some of the non-bacterial diseases were ascribed to dietetic errors. Lungworms, liver flukes, stomach worms and tape worms caused much loss. Coccidiosis occurred in some localities.

Vaccination properly applied is said to be valuable for preventive purposes against known infections.

IV. Diseases of Swine.

A. Sterility.—This was of no great significance.

B. Abortion.—60 per cent. of the cases examined were unrelated to specific infection. *B. coli* infection was found in 26 per cent. and *Br. abortus* in 5·6 per cent. of cases.

C. Diseases of New-Born Pigs.—Close on 11,000 specimens were examined, a 35-fold increase over the previous period. Diseases other than those caused by bacteria formed the majority. *B. coli* was found in 16 per cent. of all the cases, bipolar bacilli in 10 per cent. and *B. suipestifer* in 2·5 per cent. Degeneration of the myocardium was studied by Karsten and by Knauer ; the cause is not clear. A rhinitis with malformation of the nose was studied by the Hanover institute and a mixed infection with *B. pyocyaneus* and *B. pyogenes* was found : rickets was also considered to be present in this disease.

Gastro-enteritis was common ; no exact information as to its aetiology was obtained in the course of the work carried out.

V. Diseases of Young Poultry.

A. Fowls, Pigeons, Turkeys and Pheasants.—Pullorum infection is the commonest cause of death in very young birds and coccidiosis is the great scourge in the later chicken age. Other diseases referred to include fowl pox, infectious-rhinitis and fowl paralysis. Turkeys suffer from coccidiosis and " blackhead " and pigeons from pigeon pox and Breslau paratyphoid infection.

B. Waterfowl.—Young geese are commonly affected with stomach worms and are treated with carbon tetrachloride (1·5 to 2·0 c.c.) in bran. Parasitic invasion is the chief source of loss in geese and ducks.

VI. Diseases of Fur Animals.

No systematic information about the breeding diseases of these animals is yet available. Infection with the Gärtner bacillus occurs not uncommonly in silver foxes.

J. E.

REVIEW.

Van Es, L. (1932). [Professor of Animal Pathology and Hygiene, University of Nebraska]. **The Principles of Animal Hygiene and Preventive Veterinary Medicine.** 768 pp. London : Chapman & Hall, 11, Henrietta St., W.C.2. [40s.]. [8vo.]

This is a book giving very full information on animal hygiene taken in a wide sense and the author has clearly been careful to write with discrimination in order to cover the field in a comparatively small book.

There are 53 chapters of which all but 13 concern the more important contagious and parasitic diseases of domestic animals and their control. The general section contains a very interesting introductory chapter on the connection between animal health and disease with various factors :—heredity ; the soil ; air and ventilation—including constructional considerations ; water ; foodstuffs (composition of food materials and principles of dietetics, harmful foods, including reference to the commonest poisonous plants, and feeding equipment) ; radiant energy and meteorology, including acclimatization.

Stables and other animal houses are dealt with briefly and also the principles of individual animal management at home and during transit. Drainage, the disposal of wastes, and disinfection are dealt with in separate chapters. There is an account of the common animal parasites and of the ways of destroying them.

A very commendable addition to the text in the form of lists of references selected from the veterinary literature of many countries has been made throughout the book. These lists are quite short and the references have been specially selected as being of most value.

The general index is very good and includes the names of authors quoted in the book. There are numerous illustrations ; some of them are rather crude, but their meaning is sufficiently plain.

Altogether the book is a very good one. The print is clear and it has been well produced.

J. E.